

# Service Manual



ORDER NO.  
CRT1319

MULTI-CD/TUNER CONTROL CD PLAYER

# DEX-M88

US,ES

**Note:**

\* See the separate manual CX-173(CRT1161) for the CD mechanism description.

## SPECIFICATIONS

Power source	14.4 V DC (10.8-15.6 V allowable)
Grounding system	Negative type
Dimensions (chassis)	178(W) x 50(H) x 150(D) mm [7(W) x 2(H) x 5-7/8(D) in.]
(nose)	178(W) x 49(H) x 18(D) mm [7(W) x 1-7/8(H) x 3/4(D) in.]
Weight	1.7 kg (3.7 lbs)
Nominal output level/ output impedance (pre out)	500 mV/1 kΩ
Tone controls (bass)	±10 dB (100 Hz)
(middle)	±10 dB (1 kHz)
(treble)	±10 dB (10 kHz)
Loudness contour	+10 dB (100 Hz), +7 dB (10 kHz) (volume: -30 dB)
System	Compact disc audio system

Usable discs	Compact disc
Signal format	Sampling frequency: 44.1 kHz
	Number of quantization bits: 16; linear
Frequency characteristics	5-20,000 Hz (±1 dB)
Signal-to-noise ratio	106 dB (1 kHz) (IHF-A network)
Dynamic range	92 dB (1 kHz)
Number of channels	2 (stereo)

*These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.*

**Note:**

Specifications and the design are subject to possible modification without notice due to improvements.

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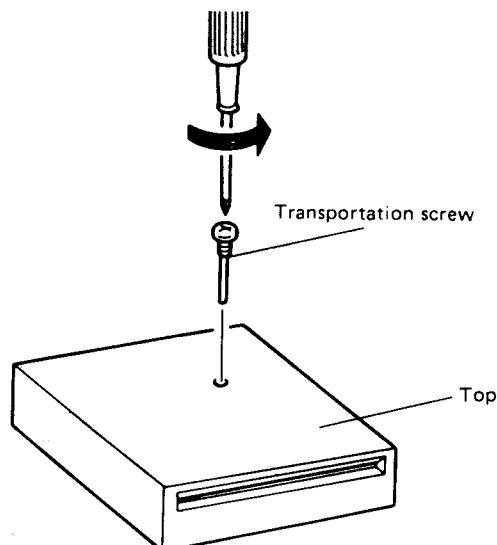
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FS NOV. 1990 Printed in Japan

- **CD Player Service Precautions**

1. Since these screws protect the mechanism during transport, be sure to affix it when it is transported for repair, etc.
2. For pickup unit (CGY1015) handling, please refer to "Disassembly" (Fig. 4). During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
3. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.



## SAFETY INFORMATION (US MODEL)

### **CAUTION**

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

### **WARNING**

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

# 1. CONNECTING THE UNITS

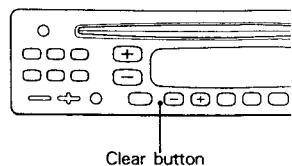
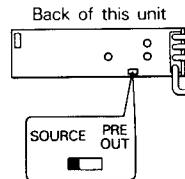
- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the owner's manual for details on connecting the various cords of the power amp and other units, then make connections correctly.
- Be sure to connect the memory power supply lead (orange) to a terminal that is always supplied with power regardless of the vehicle's ignition switch position. If this connection is made incorrectly or is forgotten, the unit will not work at all.
- Don't pass the orange lead through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.
- For 2-speaker systems, wire the rear output cord to the main amp.

## The Source Switch

Be sure to set this switch to the SOURCE side when a cassette deck is used in conjunction with the main unit. Then, when wiring has been completed, press the clear button.

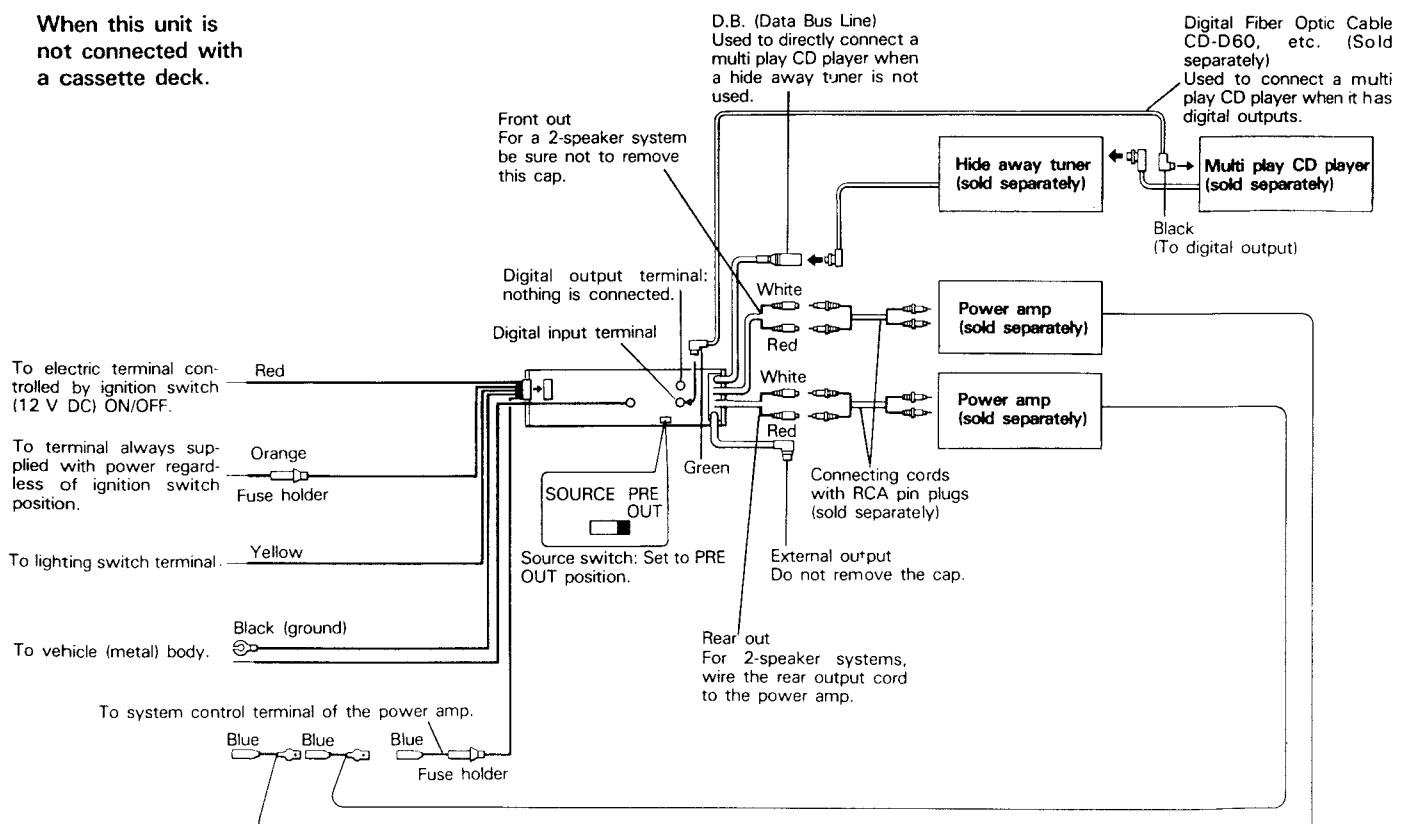
### When the source switch is in the SOURCE position:

- The cassette deck takes precedence, so to operate the disc player, turn off the cassette deck's power.
- Audio adjustments such as volume, fader, and bass on the main unit do not function. Perform these adjustments at the cassette deck.
- Although the main unit's CD player will function, the separately available multi play CD player and the hide away tuner can not be operated even if they are connected.
- The remote control associated with the main unit can not be used.

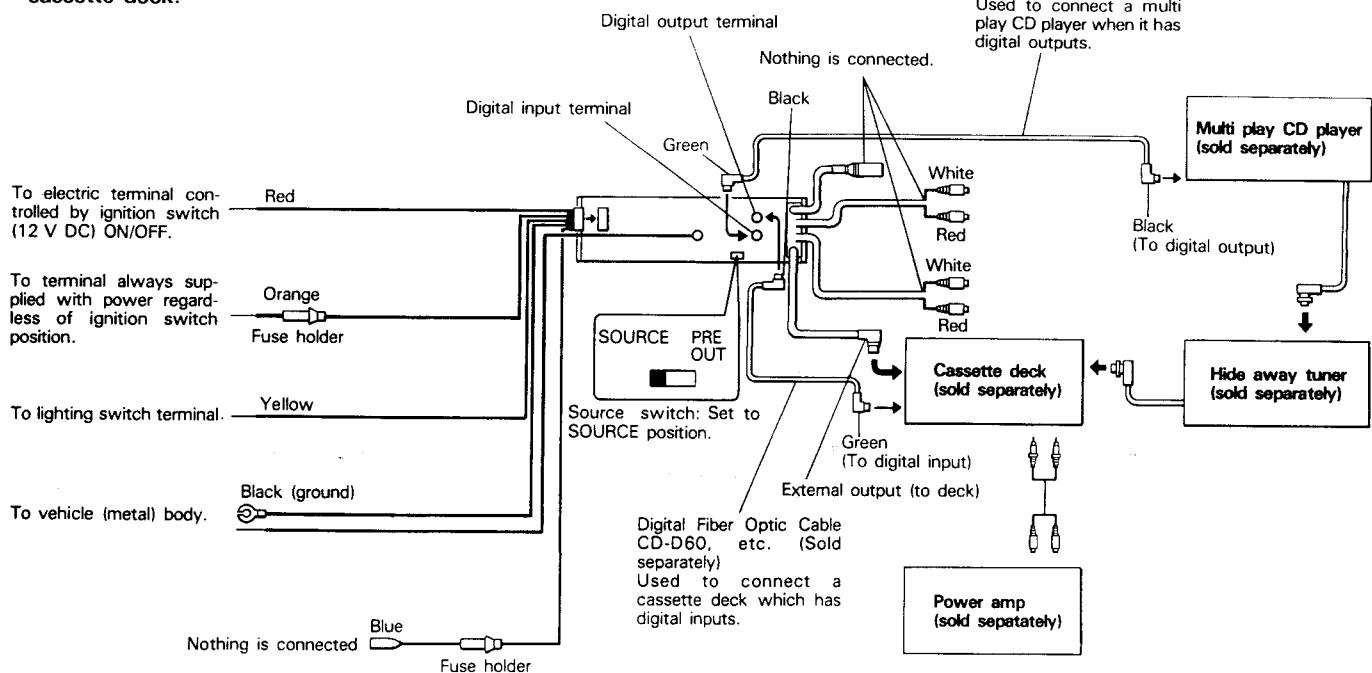


Set the source switch to the SOURCE position.

## When this unit is not connected with a cassette deck.



When connecting this unit with a cassette deck.



## 2. USING THE REMOVABLE FRONT PANEL

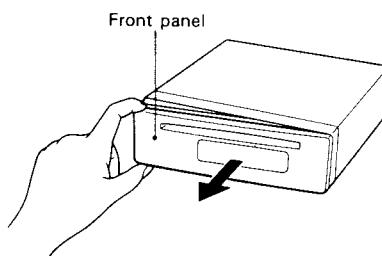
The front panel of this unit can be removed to prevent theft. Also, to prevent forgetting to remove the front panel, 5 seconds after the ignition is turned off, if the front panel is still attached, a buzzer will sound for a few seconds.

- When using the unit with the front panel fastened in place, mount it securely with the accompanying screw and bracket.

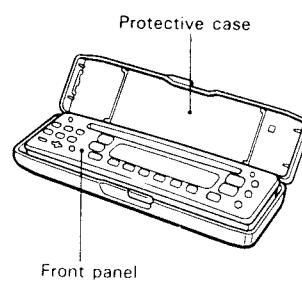
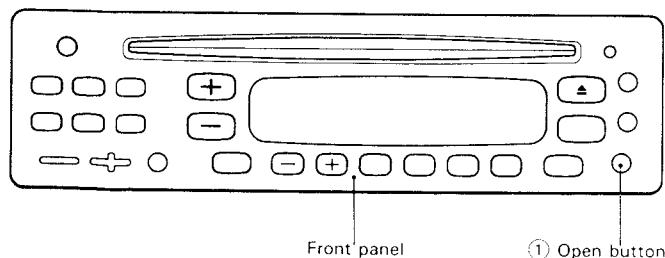
### Detaching the Front Panel

1. Press button ①, and the left-hand side of the panel will eject.
- The button ① may only be used when the ignition key is turned on, or within 30 seconds after turning the ignition off. If more than 30 seconds have passed since the ignition was turned off, button ① will not open the front panel.
- Removal of the front panel is disabled when the ignition key is turned to OFF during disc loading or ejection, even if button ① is pressed afterwards. To remove the front panel, turn the ignition key to ON, then press button ①.
- The front panel cannot be removed during disc loading or ejection.

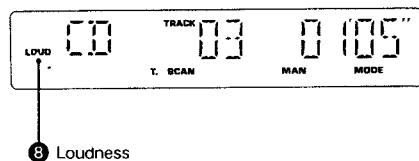
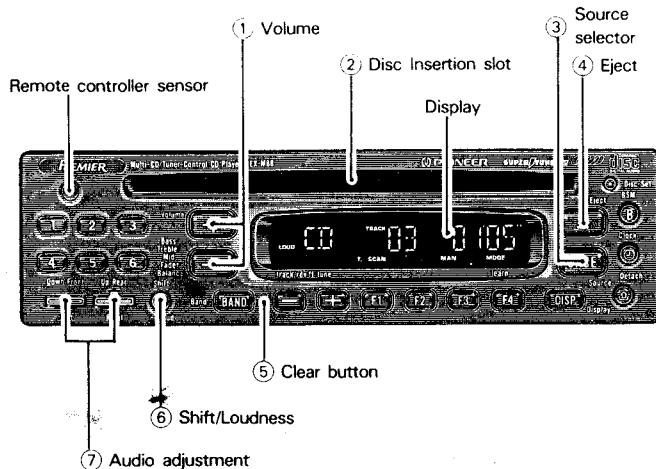
2. To remove the front panel, pull its left-hand side toward you.



- Take care not to put pressure on the display or drop the front panel.
- 3. Enclose for safekeeping the front panel that is removed in the supplied protective case.



### 3. SWITCHING POWER ON/ADJUSTING VOLUME AND TONE



#### CAUTION:

When the main unit is used in conjunction with a cassette deck, (and the SOURCE/PRE OUT switch at the back of the unit is switched to the SOURCE position), be aware of the following items.

- The cassette deck takes precedence, so to operate the disc player, turn off the cassette deck's power.
- Audio adjustments such as volume, fader, and bass on the main unit do not function. Perform these adjustments at the cassette deck.
- Although the main unit's CD player will function, the separately available multi play CD player and the hide away tuner can not be operated even if they are connected.
- The remote control associated with the main unit can not be used.

#### Using the Clear Button

Once all wiring is complete, press Button ⑤ with a thin, pointed object. Though not a normal occurrence, the microprocessor which controls the operation of this unit can be affected by electrostatic noise. This generally is indicated by such symptoms as no power being supplied when you switch the unit on, failure of buttons and controls, or an abnormal display. Should this happen, press Button ⑤ with a thin, pointed object to reset the microprocessor. Note that doing so also resets all audio controls, so you will have to make any desired settings again.

#### Switching Power On

When a disc is inserted half-way into the disc insertion slot ② with its label side upward, the disc is automatically loaded and played. To remove the disc, push button ④.

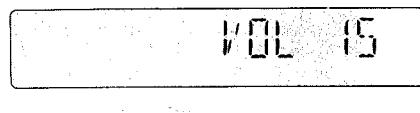
#### Changing the source

To change the source, push button ③ with the disc inserted in the slot. At each press of the button, the source changes as follows: CD Player-OFF When the separately available multi play CD player and Hide-away tuner are installed, pressing the button cycles through the devices in the following order: CD player, multi play CD player, tuner, power OFF.

- When there is no disc magazine inserted in the multi play CD player, it will not be selected.

#### Adjusting Volume

Pressing the (+) side of button ① increases the volume, while the (-) side decreases it.

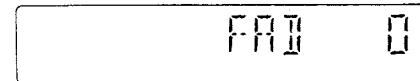


#### Adjusting the Other Audio Controls

Pushing button ⑦ adjusts the fader control. Also, pressing button ⑥ cycles the display through fader, bass, mid, treble, and balance, and button ⑦ will adjust the displayed control.

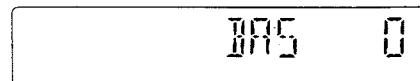
#### Adjusting the Fader

This function controls the balance between the front and rear speakers of a 4-speaker system. Pressing the (-) side of button ⑦ shifts the balance to the front speakers, while the (+) side shifts it to the rear speakers. For 2-speaker systems, set FAD 0.



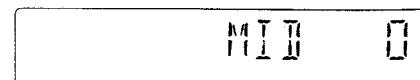
#### Adjusting Bass

Pressing the (+) side of button ⑦ increases bass, while the (-) side decreases bass.



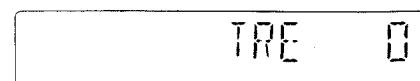
#### Adjusting Middle

Pressing the (+) side of button ⑦ increases middle, while the (-) side decreases middle.



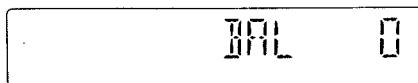
#### Adjusting Treble

Pressing the (+) side of button ⑦ increases treble, while the (-) side decreases treble.



**Adjusting Balance**

Pressing the (–) side of button ⑦ shifts the balance to the left speaker, while the (+) side shifts it to the right speaker.

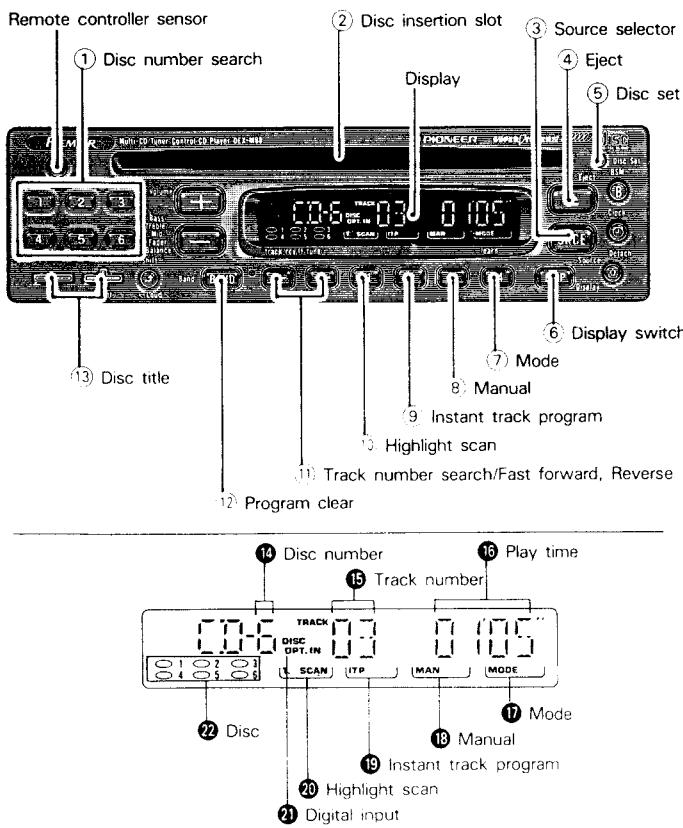


- When you're adjusting fader, bass, middle, treble, or balance settings, the indicator will stop at the center setting. About 5 seconds after adjustment has been made, the display returns to its previous state.

**Using the Loudness Function**

Press button ⑥ for about two seconds and the "LOUD" ③ indication will appear on the display. This loudness function lets you enhance both high and low frequencies to give a more natural sound at low volumes. To cancel this function, press button ⑥ again for about two seconds.

## 4. PLAYING COMPACT DISCS



This unit, in addition to playing discs on its built-in CD player, also functions as the controller for the separately available multi play CD player when installed. The owner's manual for the multi play CD player does not include instructions on operating the CD controller. This manual also covers operation of the CD controller section along with operation of the main unit's built-in CD player.

### Playing Discs on the Main Unit's Built-in CD Player

**NOTES:**

When the main unit is used in conjunction with a cassette deck, (and the SOURCE/PRE OUT switch at the back of the unit is switched to the SOURCE position), since the cassette deck takes priority over the CD player, turn off the cassette deck power switch to listen to discs.

**1** On inserting the CD, with the label side up, half way into the CD slot ②, it will automatically be set into position and start to play. The track number ⑮ and playback time ⑯ indicators will light.

**2** Adjust the volume and tone controls.

**3** To stop CD playback, press button ③ turning the power off. To restart playback, press button ③. Playback will begin from the part of the track that was playing when playback was stopped.

- When the separately available multi play CD player or Hideaway tuner are installed, operation differs.

**4** To remove or change discs, press button ④.

When the disc is ejected, pressing it will cause it to be set into position again, and playback to start.

## Using the multi play CD Player (Requires purchasing the multi play CD player which is available separately)

The Magazine Type Multi-Play CD players with  mark and the Magazines with the same mark are compatible for 5-inch (12 cm) discs.

### CAUTION:

When the main unit is used in conjunction with a cassette deck, (and the SOURCE/PRE OUT switch at the back of the unit is switched to the SOURCE position), although the main unit's built-in CD player may be used, the multi play CD player can not be operated.

**1** When button ③ is pressed, the multi play CD player's power is turned on, and the disc number ⑭, track number ⑮, and playback time ⑯ displays will light.

Pressing this button switches the system between multi play CD player and power OFF states.

- Operation will differ in such cases as there being a CD in the main unit's built-in CD player, or the separately available hide away tuner being installed.
- There is a digital output terminal on the multi play CD player. When the output from this terminal has been connected to the digital input-terminal on the main unit, "OPT. IN" will appear on the display.
- When the multi play CD player is first connected to the main unit, the system may not operate correctly. (For example, the multi play CD player may not be selected by pushing button ③.) In this case, press the clear buttons on both the main unit and the multi play CD player.

**2** Select a disc using disc number search. Use the buttons ① to select the desired disc. The number of the selected disc will be displayed in the display ⑯.

- The numbers in the disc ⑯ display indicate the existence of discs in the magazine. If a number is lighted, then there is a disc loaded in that position.

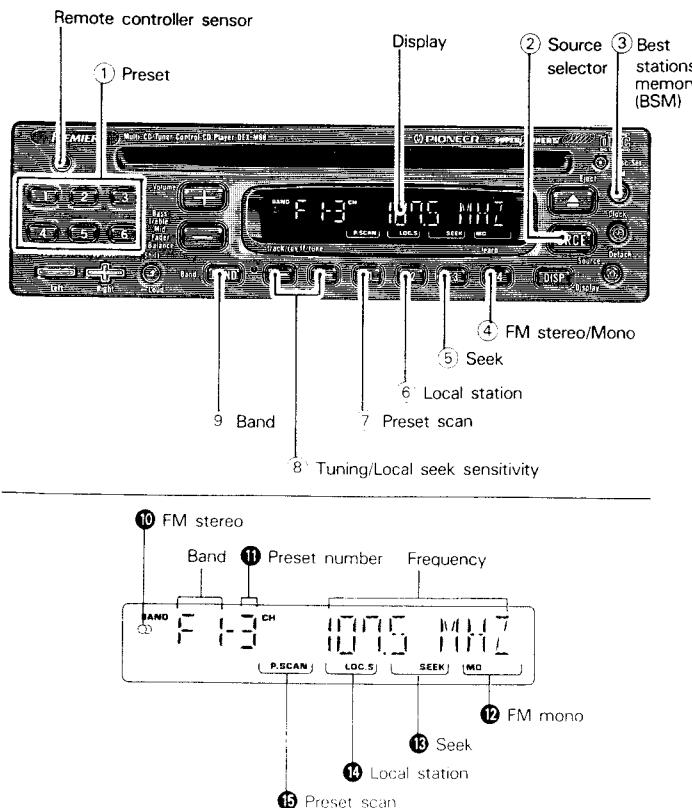
• If there is a tray without a disc in the magazine, that tray number will not be selected even if its button is pushed.

**3** Adjust the volume and tone.

**4** To stop disc playback, push button ③ turnign off the power. Pushing this button switches between the multi play CD player and the power off states.

- If there is a disc inserted in the main unit's CD player, or if the separately available hide away tuner is connected, operation will differ. To resume paly, press button ③ again, and play will resume in the vicinity of the track that was interrupted.
- When the multi play CD player (CDX-M100) is installed, if playback is stopped and then restarted, it will resume play at the beginning of the track that was stopped.

## 5. USING THE RADIO



When the separately available hide away tuner is connected to the main unit, it can function as the tuner controller. The owner's manual provided with the hide away tuner does not cover tuner controller operation. This manual also covers operation of the tuner controller.

### CAUTION:

When the main unit is used in conjunction with a cassette deck, (and the SOURCE/PRE OUT switch at the back of the unit is switched to the SOURCE position), although the main unit's built-in CD player may be used, the hide away tuner can not be operated.

**1** Turn on the tuner's power by pressing button ②.

Each time the button is pushed the main unit switches between tuner and power off modes.

- This operation will differ if there is a CD inserted in the CD player, or if the separately available multi play CD player is connected.
- When the hide away tuner is connected to the main unit for the first time, it may not operate correctly. (Pressing button ② may not switch to the tuner, for example.) If this occurs, press the clear button on the main unit.

**2** Press Button ⑨ to select a band.

F 1 → F 2 → F 3 → A 1  
(FM1) (FM2) (FM3) (AM)

**3** Use seek tuning to tune in a frequency.

Confirm that the seek frame ⑬ on the display is illuminated. If it is not, press button ⑤ to light it. Press button ⑧ to either the (+) or (-) sides. The tuner will automatically tune in the next higher frequency if the (+) side was pushed, or the next lower frequency if the (-) side was pushed.

4 Adjust volume and tone.

5 Assign the tuned frequency to one of the Buttons in Bank ① (preset memory).

Press and hold down one of the buttons in Bank ① for at least two seconds. The frequency is assigned to the selected button when the preset number ⑩ stops flashing on the display. Up to 18 FM stations (6 each for FM1, FM2 and FM3), and six AM stations can be assigned to the preset memory buttons in Bank ①.

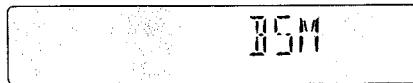
6 Once a frequency is assigned to a Button in Bank ①, you just need to press that Button to tune it in.

This also causes the number of the button pressed to appear at Position ⑩ on the display.

### BSM (Best Stations Memory)

This function automatically locates stronger stations and automatically assigns their frequencies to the buttons in Bank ①, from strongest to weakest. It comes in handy when trying to find local stations while driving.

1. Press button ⑨ and select a band.
2. Hold down button ③. After about two seconds, a "beep" will sound to signal that the BSM search has started. At this time, "BSM" will flash on the display.



3. The frequency display will return once BSM search is complete, and frequencies are assigned to buttons 1 through 6 in Bank ①.
- At the end of the BSM search, the displayed frequency is that assigned to button ① of Bank ①.
- If there are fewer than six strong stations in the area, some of the buttons in Bank ① will not be assigned frequencies, so they will retain any frequencies assigned to them previously.
- BSM search may take as long as 30 seconds in areas where there are few strong stations.
- You can cancel BSM search by pressing button ③ again.

### Preset Scan Tuning

This function lets you automatically monitor the stations assigned to the preset buttons.

1. Pressing button ⑦ turns on the frame of preset scan ⑬ and flashes preset number ⑩. Each station assigned to the buttons in Bank ① will be automatically tuned in for about eight seconds.
2. When you hear a station that you like, press button ⑦ again to cancel preset scan tuning and remain at that station.

### Manual Tuning

Use manual tuning when stations are too weak to be picked up by seek tuning.

1. Clear the SEEK frame ⑬ illumination by pressing button ⑤.
2. Each press of the (+) side of button ⑧ increases the frequency in 0.2 MHz steps in the FM band, 10 kHz in the AM band. Pressing the (-) side of button ⑧ decreases the frequency. Holding down either side of button ⑧ changes the frequency at high speed.

### Switching between FM Stereo and Mono

Generally, it is best to allow the "Super Tuner" function to automatically set the optimum listening conditions. ⑬ ⑭ turns on during stereo broadcast is in reception. When there is a large amount of noise, you can press button ④ for clearer mono reception (The frame of FM mono ⑬ turns on).

## Adjusting Seek Sensitivity

The seek tuning function of this tuner lets you select between a local setting for reception of strong stations only, and a DX (distant) setting for reception of weaker stations. The local setting also has four seek tuning sensitivity levels for FM and two levels for AM to match local conditions.

### Changing the Local Seek Sensitivity

1. Use button ⑨ to select a band.
2. Hold down the button ⑥ for more than two seconds, and the display will show you the current local seek sensitivity for about five seconds.



(Example: LOC-2)

3. While the local seek sensitivity remains on the display, press the (+) side of button ⑧ to increase the sensitivity level, and the (-) side to decrease the level as shown below.

FM : LOC-1  $\Rightarrow$  LOC-2  $\Rightarrow$  LOC-3  $\Rightarrow$  LOC-4

AM : LOC-1  $\Rightarrow$  LOC-2

The LOC-4 setting allows reception of only the strongest stations, while lower settings let you receive progressively weaker stations.

- The display of local seek sensitivity returns to the frequency when about five seconds have elapsed after the change of sensitivity.

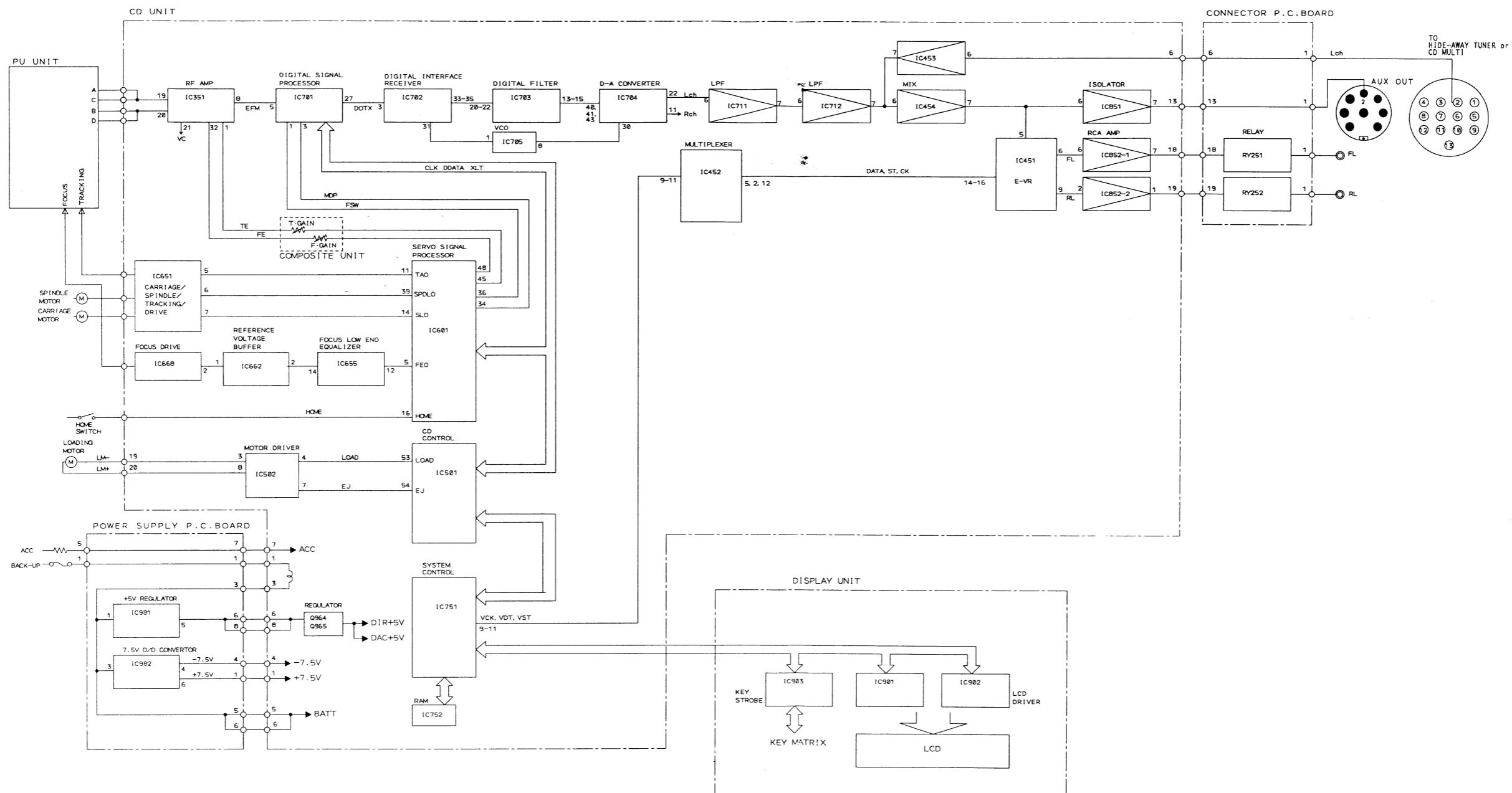
### Switching between Local and DX

Press button ⑥ to switch between Local and DX (distant) seek tuning. When the frame of local seek ⑬ is lit, seek tuning is performed with the local seek sensitivity. Otherwise, seek tuning is performed with the DX seek sensitivity.

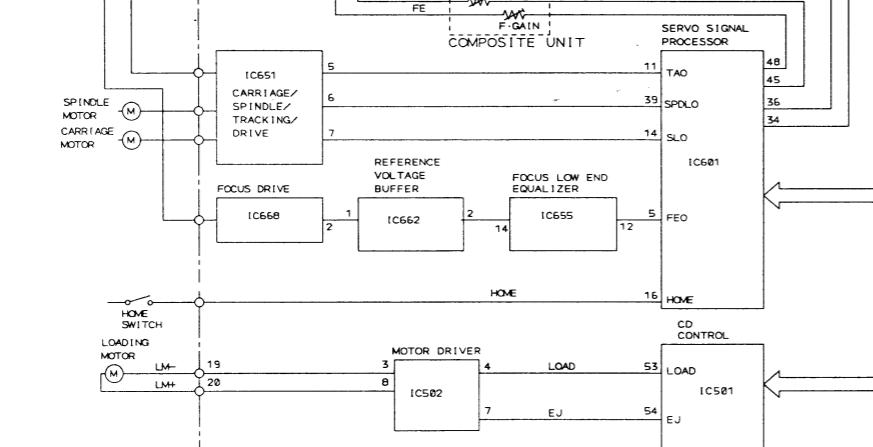
## 6. BLOCK DIAGRAM

DEX-M88

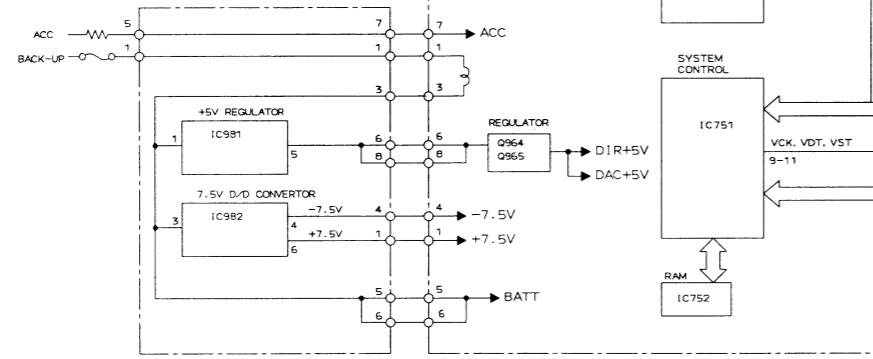
A



B



C



D

A

B

C

D

Fig. 1

1

2

3

4

5

6

10

## 7. DISASSEMBLY

### ● Display Assy

1. When removing the display assembly with power disconnected, pull the display assembly on the left-hand side as shown with arrow mark for removal.

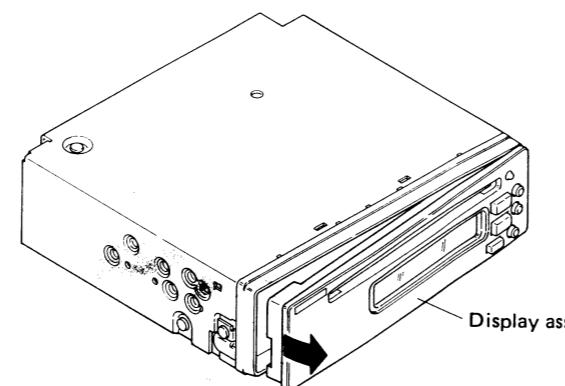


Fig. 2

### ● Case

1. Remove the five screws, and then remove the case.

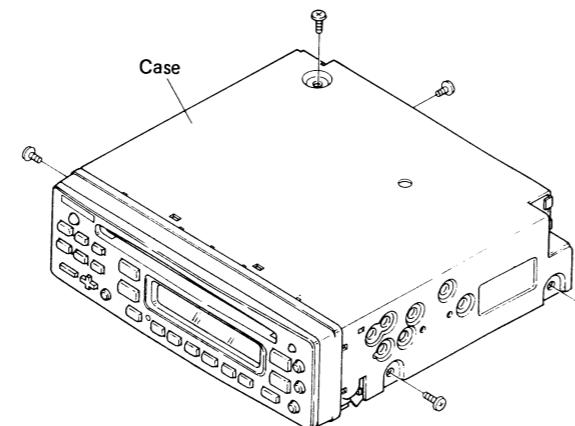


Fig. 3

### ● Detach Grille Assy

1. Remove the two screws.
2. Unbend the tabs at two locations indicated by arrows A.
3. Remove the connector.

### ● CD Mechanism Unit

1. Remove the four screws.
2. Disconnect the two connectors, and then remove CD mechanism unit.

#### NOTE:

When remove the flexible p.c. board, always insert a shorting pin or insert an inter-pattern short(jumper) before disconnecting the flexible p.c. board from the connector.

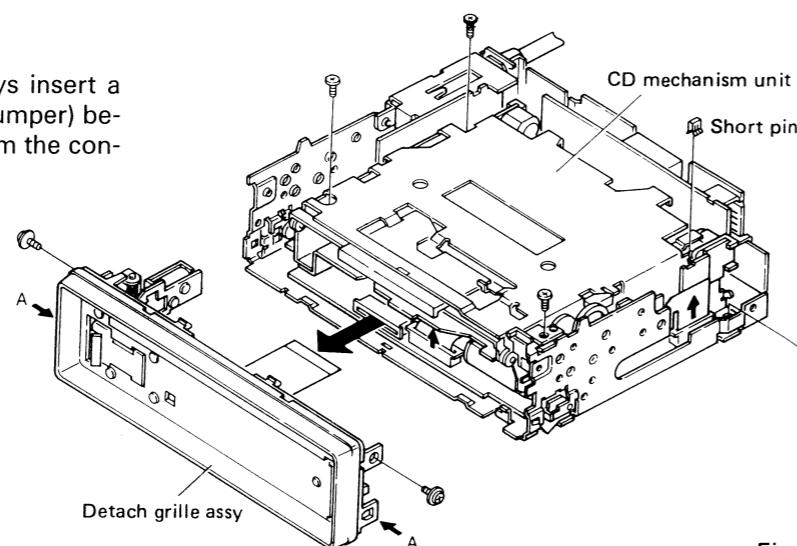


Fig. 4

### ● Connector P.C. Board

1. Remove the screw B.
2. Disconnect the two connectors, and then remove connector p.c. board.

### ● OPT OUT P.C. Board

1. Remove the screw C.
2. Disconnect the connector, and then remove OPT OUT p.c. board.

### ● Power Supply P.C. Board

1. Remove the two screws D.
2. Disconnect the two connectors, and then remove power supply p.c. board.

### ● CD Unit

1. Remove the three screws E.
2. Unbend the tabs at three locations indicated by arrows until straight.
3. Remove the CD unit.

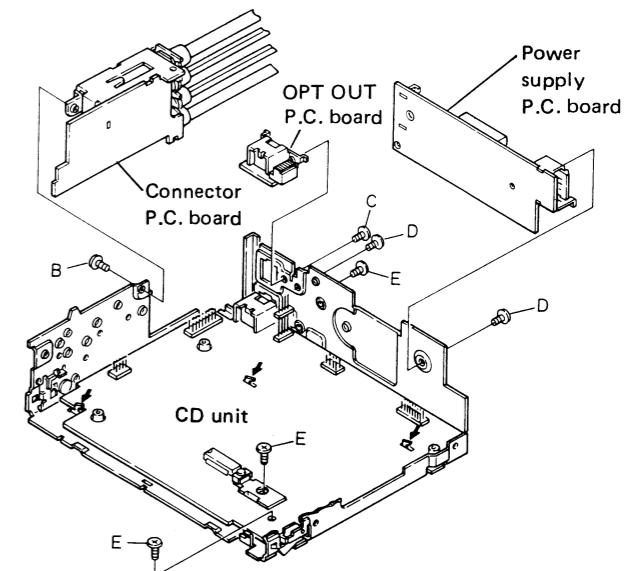


Fig. 5

## 8. ADJUSTMENT

### 1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to pin No. 21 (approx. 2.5V) of IC 351 (CXA1081Q) instead of GND. (VC or VREF at test point)

If VC and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.

Do not connect the negative probe of the measuring equipment to VC and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to VC with the channel 2 negative probe connected to GND.

And since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.

If by accident VC comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

### • Test mode starting procedure

While pressing the 6 key and the RIGHT key, press CLEAR button.

### • Test mode cancellation

Press the CLEAR button. (Or switch ACC, back-up OFF.)

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.

\*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.

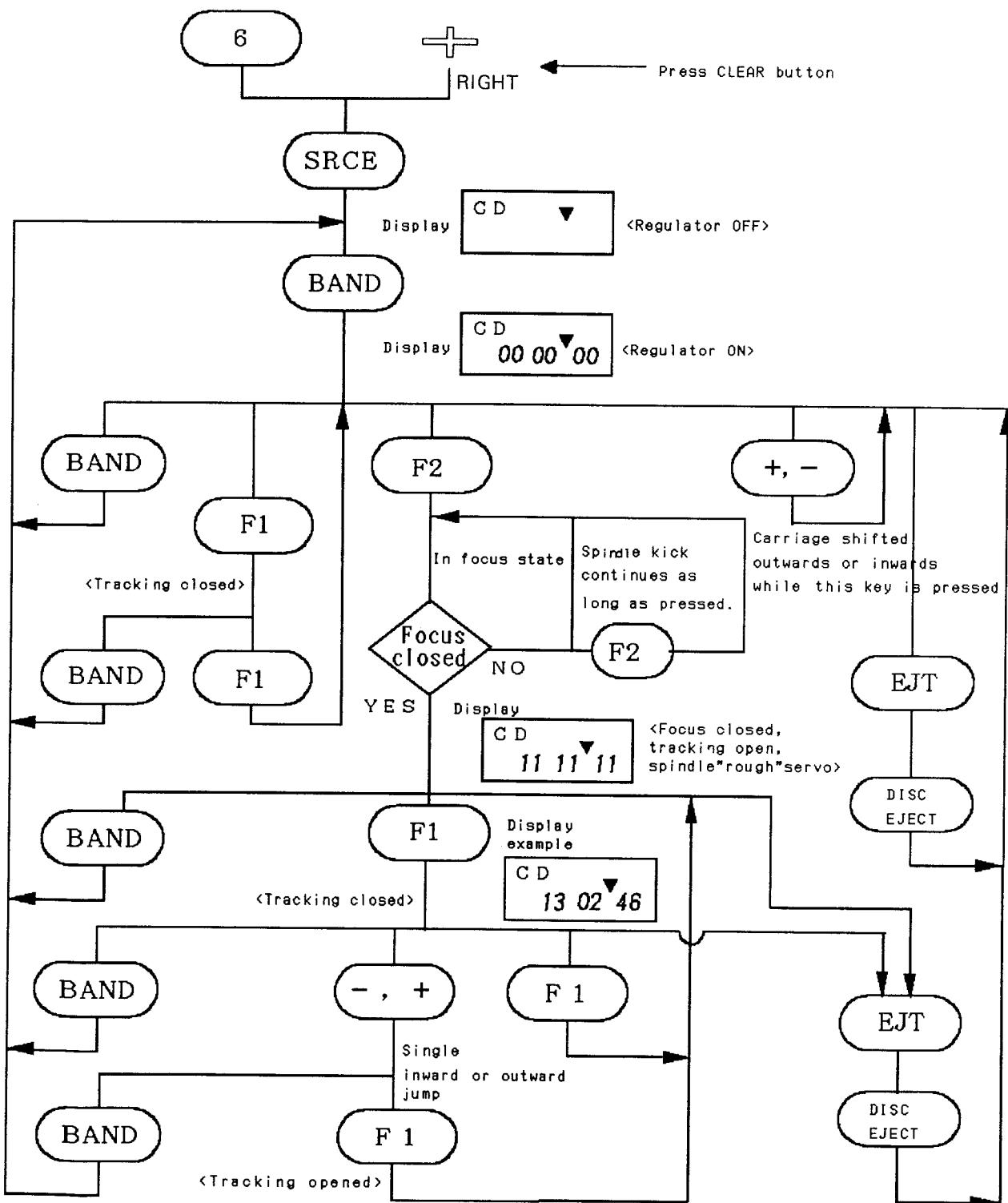
\*The unit will not load a disc.

When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

Key	Function
BAND	Regulator ON/OFF
+	FWD Kick
-	REV Kick

Key	Function
F1	Tracking close
F1	Tracking open
F2	Focus close

### • Flow Chart



*Note:*

*After the EJT key has been pressed and until disc ejection is complete, do not press any key other than the EJT key. In the test mode, immediately turn off power if — or + key is pressed during focus search.*

*(There is a danger of actuator burnout with the lens bottoming or topping out.)*

● Adjustment Point

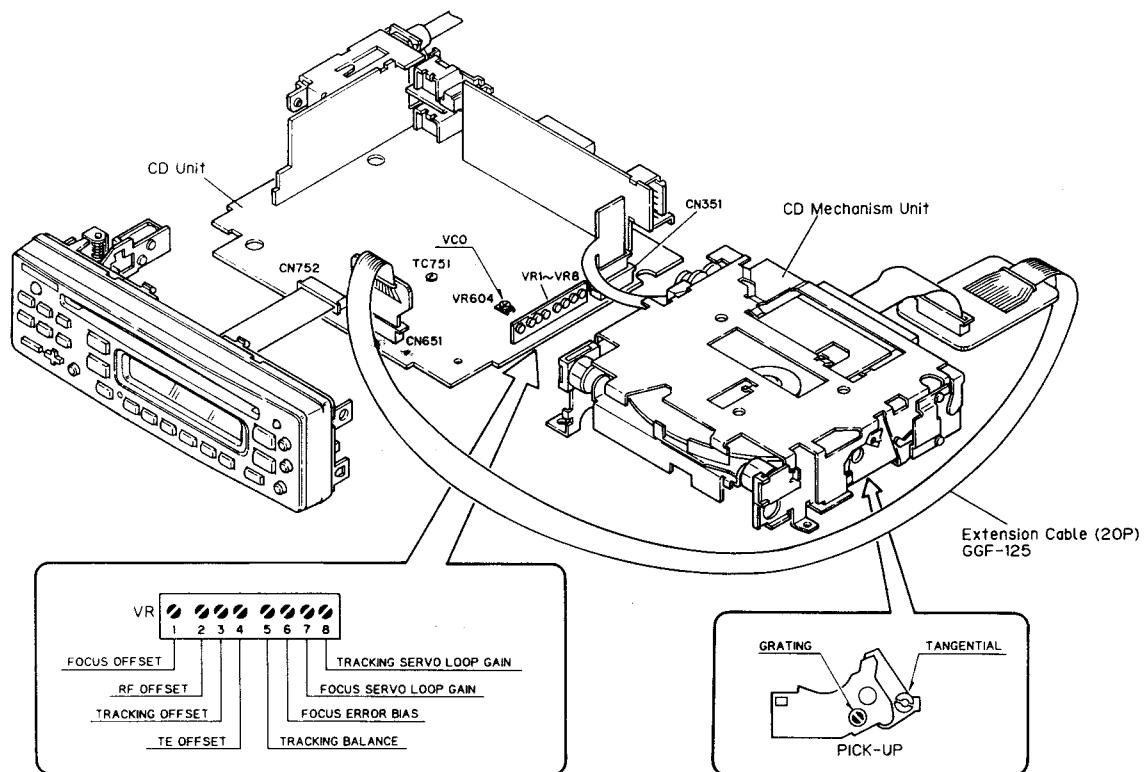


Fig. 6

- **Test Point**  
CD Unit (Foil side)

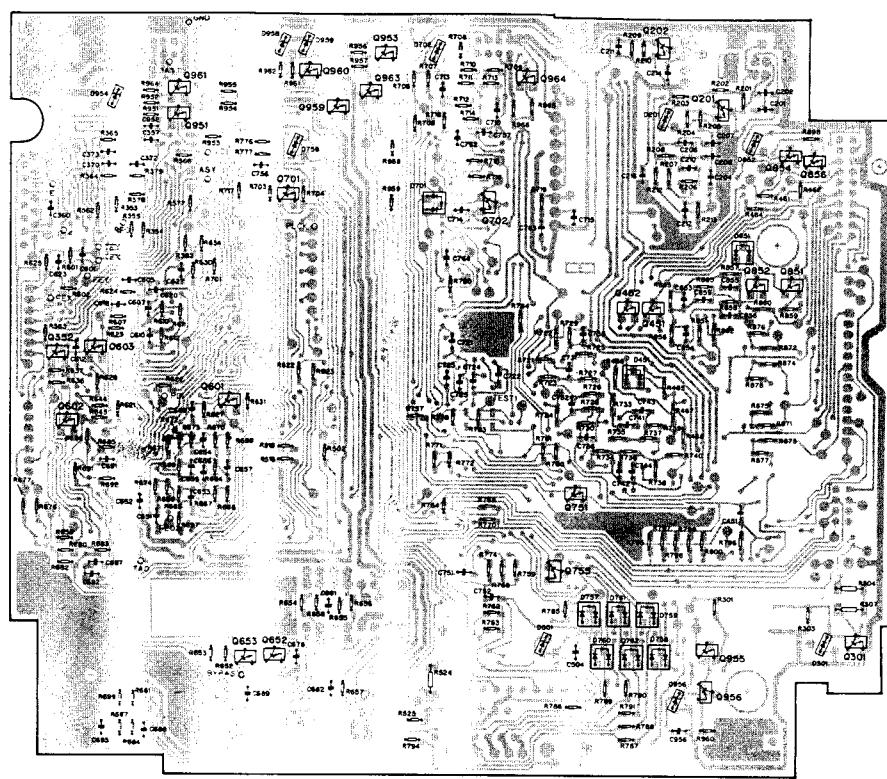


Fig. 7

### CD Unit (Parts mounted side)

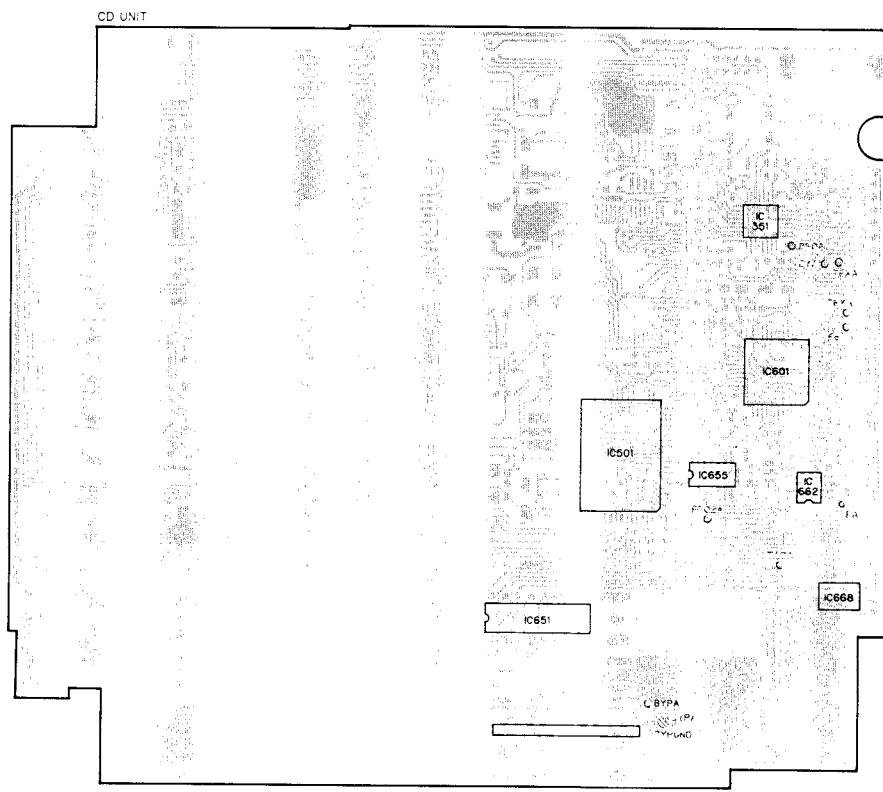


Fig. 8

## 8.1 Focus Offset Adjustment

● Purpose: To adjust the electrical offset of the focus amplifier to zero.

● Maladjustment symptoms: No focus closing

● Measuring equipment/jigs	• Multi-meter or oscilloscope
● Measuring point	• FE02
● Test disc and setting	• No Disc
● Adjustment position	• VR1
	• Test mode

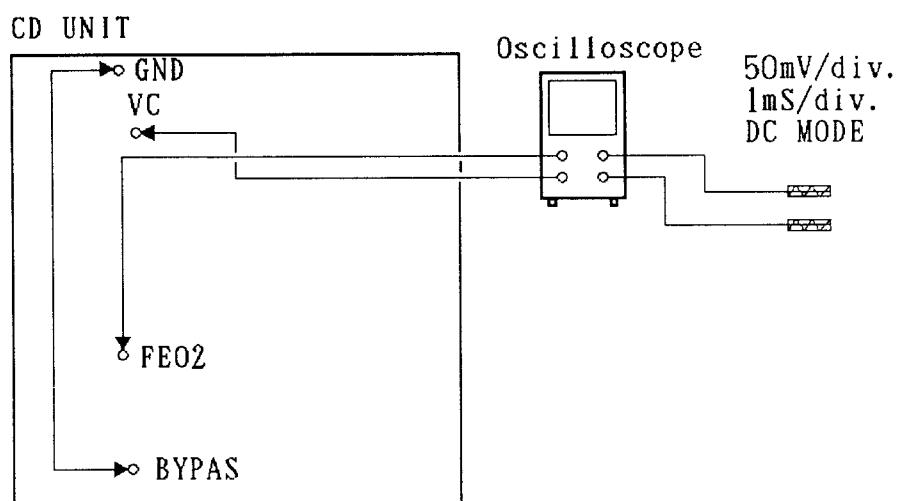


Fig. 9

(This P.C. Board connection diagram is viewed from the foil side.)

### Adjustment Procedure

1. Connect BYPAS to GND. (or solder BYPA and BYPGND on the part mounted side)
2. Switch regulator ON.
3. Using VR1, adjust the FE02 DC voltage in reference to VC to a value of  $0 \pm 25\text{mV}$ .

## 8.2 VCO Free Run Frequency Adjustment

- Purpose: To adjust the EFM decoder reference clock free-run frequency to a suitable value
- Maladjustment symptoms: Spindle lock not possible, distorted sound or no sound at all

● Measuring equipment/jigs	• Frequency counter
● Measuring point	• Pin No. 70 (PLCK) of IC701 (CXD1167Q)
● Test disc and setting	• No Disc • Test mode
● Adjustment position	• VR604

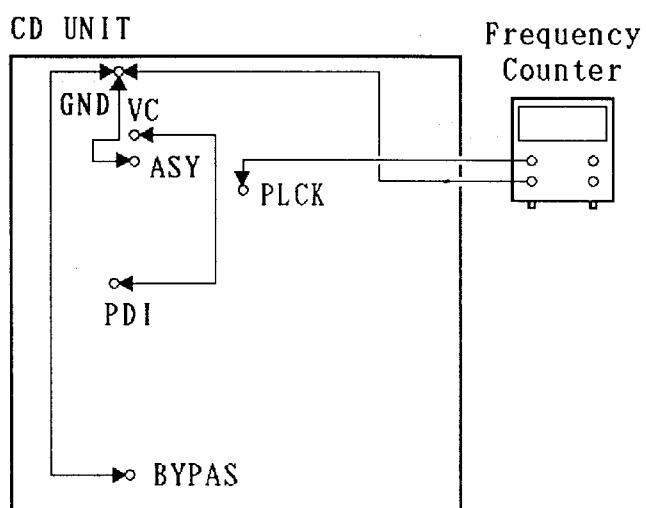


Fig. 10

**Adjustment Procedure**

1. Connect pin No. 7 (TP ASY) of IC351 to GND.  
Connect BYPAS to GND.
2. Connect pin No. 1 (TP VC) of IC601 to pin No. 28 (TP PDI).
3. Switch regulator ON while in test mode.
4. Connect the frequency counter to pin No. 70 (TP PLCK) of IC701 (CXD1167Q).
5. Adjust VR604 to obtain a frequency of  $4.45 \pm 0.01$  MHz.
6. Switch regulator OFF.
7. Disconnect the leads connecting TP VC to TP PDI, and TP ASY to GND.

Note: Connect TP VC and TP PDI with leads kept as short as possible.  
Note: Connect the frequency counter ground to TP GND as shown in the figure.

## 8. 3 RF Offset Adjustment

● Purpose: To adjust the RF amplifier offset to a suitable value

● Maladjustment symptoms: Focus closure fails readily

● Measuring equipment/jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• No Disc • Test mode
● Adjustment position	• VR2 (RFO)

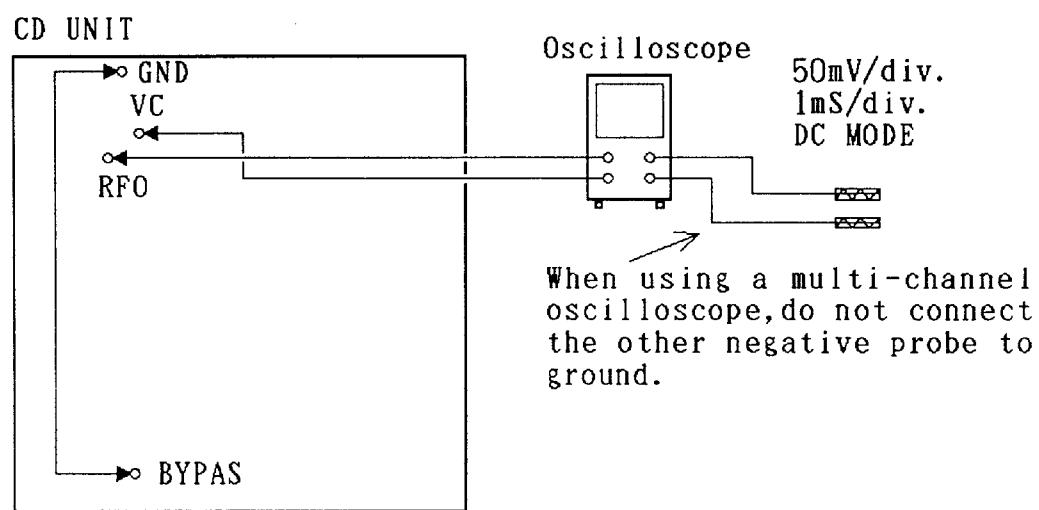


Fig. 11

## Adjustment Procedure

1. Connect BYPAS to GND.
2. Switch regulator ON.
3. Using the oscilloscope, measure the RFO DC voltage in reference to VC, and adjust VR2 (RFO) to obtain a reading of  $+40 \pm 10\text{mV}$ .

## 8.4 Tracking Offset Adjustment

● Purpose: To adjust the electrical offset of the tracking amplifier to zero

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/jigs	• Oscilloscope
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No Disc • Test mode
● Adjustment position	• VR3(T0)

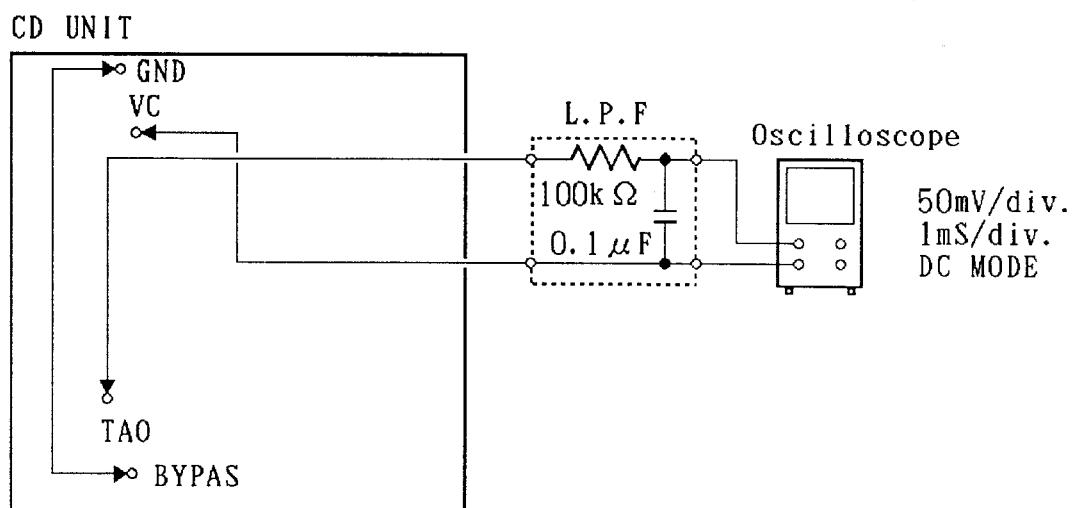


Fig. 12

**Adjustment Procedure**

1. Insert a low-pass filter between TAO and VC.
2. Check that BYPAS is connected to GND.
3. Switch regulator ON.
4. Using the oscilloscope, measure the TAO LPF output DC voltage in reference to VC, and adjust VR3(T0) to obtain a reading of  $0 \pm 25\text{mV}$ .

The low-pass filter may be left in place for later adjustments.

## 8.5 TE Offset Adjustment - I

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No Disc • Test mode
● Adjustment position	• VR4(TE0)

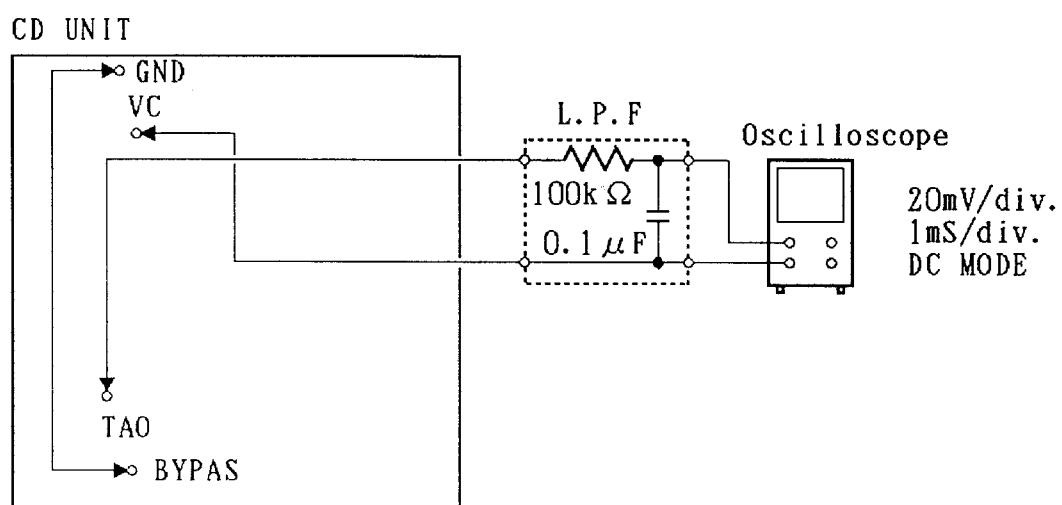


Fig. 13

## Adjustment Procedure

1. Check that BYPAS is connected to GND.
2. Switch regulator ON while in test mode.
3. Press the F1 key to close tracking.
4. Using VR4(TE0), adjust the TAO LPF output DC voltage in reference to VC to a value of  $0 \pm 10\text{mV}$ .
5. Switch regulator OFF.

## 8. 6 Tracking Balance Adjustment - I

- Purpose: To adjust the tracking servo offset to zero.
- Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/jigs	• Oscilloscope
● Measuring point	• TEY (Tracking error signal), low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR5 (T. BAL)

CD UNIT

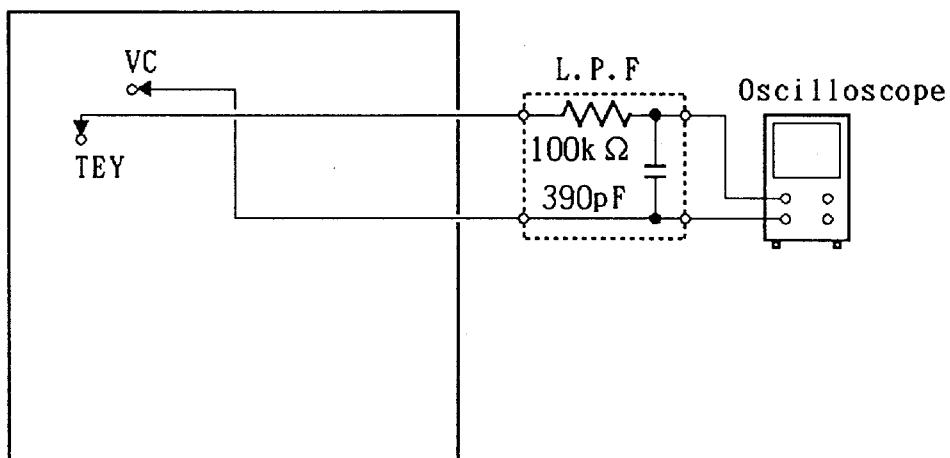


Fig. 14

**Adjustment Procedure**

1. After checking that regulator is OFF, connect the low-pass filter as shown in the diagram.
2. Disconnect BYPAS from ground.
3. Set the test disc (SONY TYPE 4). Switch regulator ON.
4. Using the + or - key, move the pick-up to about the center of the signal surface.
5. Press the F2 key to close focus.
6. Using an oscilloscope, observe the TEY signal in respect to VC. Then adjust VR5 (T. BAL) to set the positive and negative amplitudes to the same levels. (See Fig. 15-17)
7. Switch the power OFF.

The low-pass filter may be left in place for later adjustments.

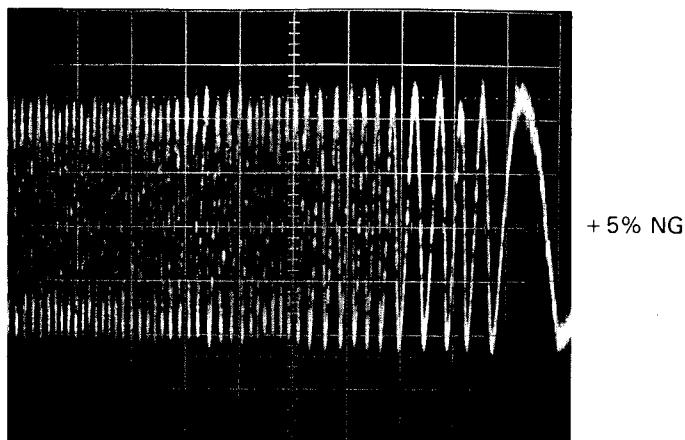


Fig. 15

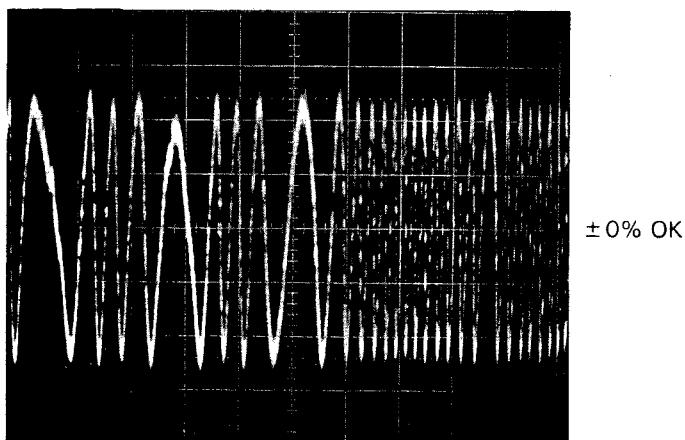
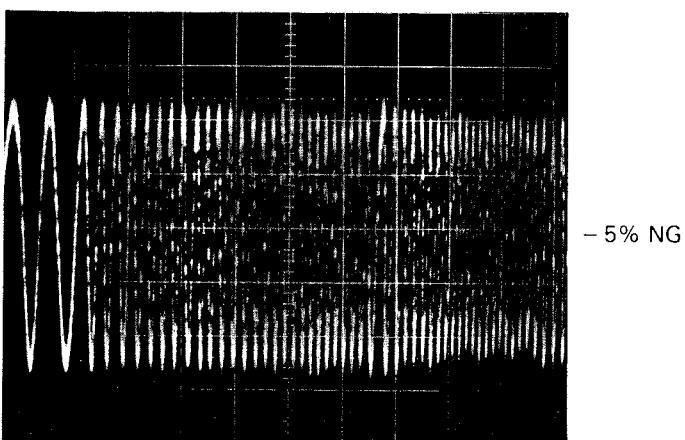


Fig. 16



10ms/div.  
0.2V/div.  
DC Mode

Fig. 17

## 8. 7 Tangential Skew Check

- Purpose: To check whether tangential skew has been misaligned or not when replacing the pick-up unit.
- Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/jigs	• Oscilloscope, screwdriver
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3)
● Adjustment position	• Normal mode • Pick-up tangential adjustment screw

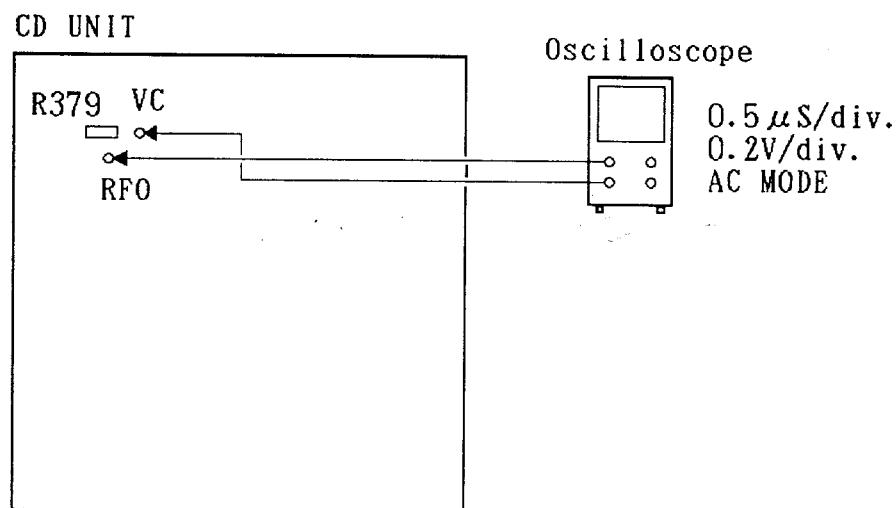
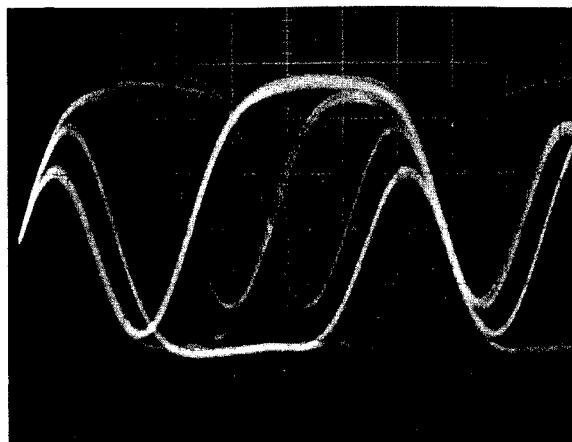


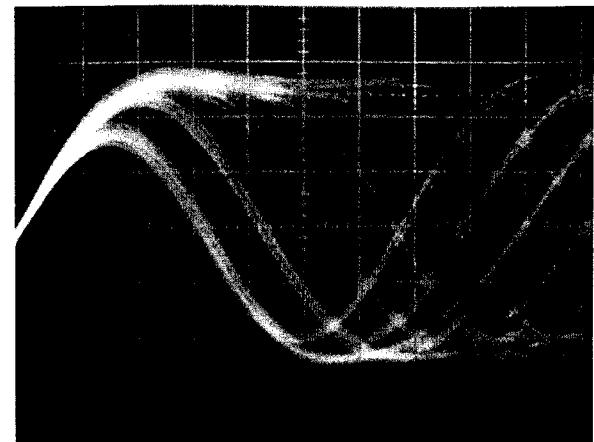
Fig. 18

**Adjustment Procedure (with R379 removed)**

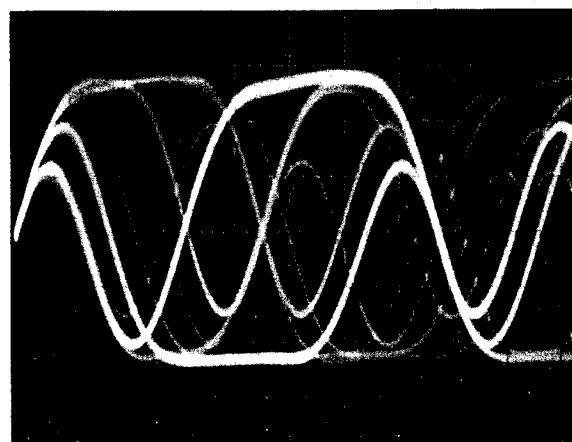
1. Remove R379 (but reconnect after completing adjustment).
2. Play tune TNO 7 in normal mode. (TYPE 3:TNO 23)
3. Check that the valley at the 11T section of the RF waveform is flat.
4. If out of adjustment, readjust to obtain a flat RF waveform. (See Fig. 19-24) Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.)
5. Switch the power OFF and reconnect R379.
6. Apply "screw-lock" to the tangential adjustment screw.
7. After adjusting tangential skew, also adjust the grating.
8. If tangential skew is seriously out of adjustment, carriage stopping and run-away tend to occur in normal mode. In this case,
  - a) Switch to test mode,
  - b) Shift the pick-up to signal surface center using + or - key,
  - c) Press the F2 key to close focus,
  - d) Press the F1 key to close tracking,
  - e) Observe RFO in respect to VC, and turn the tangential adjustment screw to obtain a flat waveform at the 11T section,
  - f) Repeat the adjustment resuming from step 2.



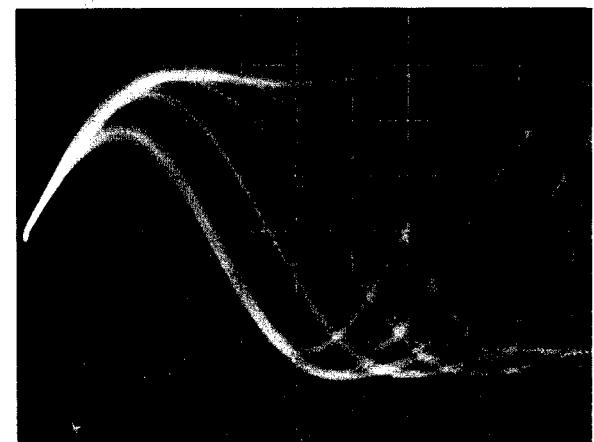
NG Fig. 19



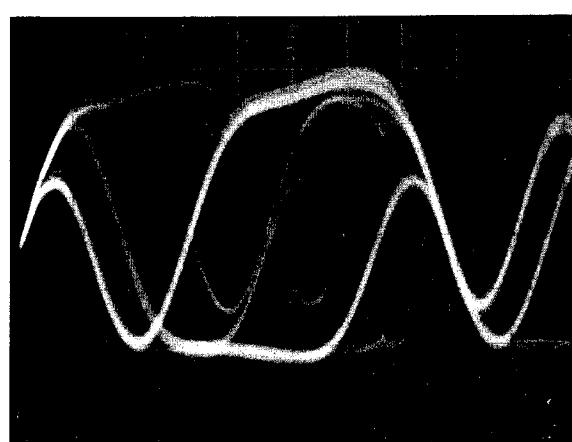
NG Fig. 20



OK Fig. 21

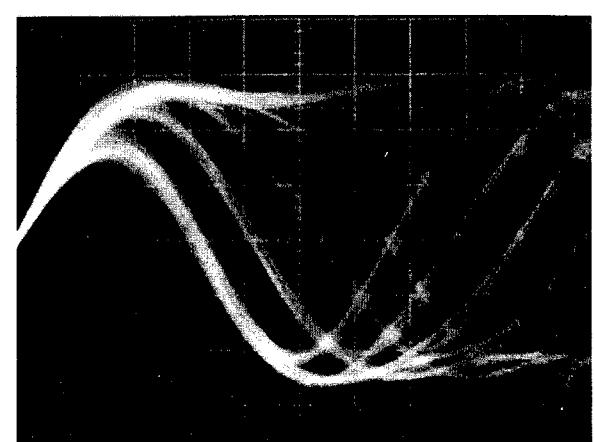


OK Fig. 22



NG Fig. 23

Play tune TNO 7 (TYPE4)

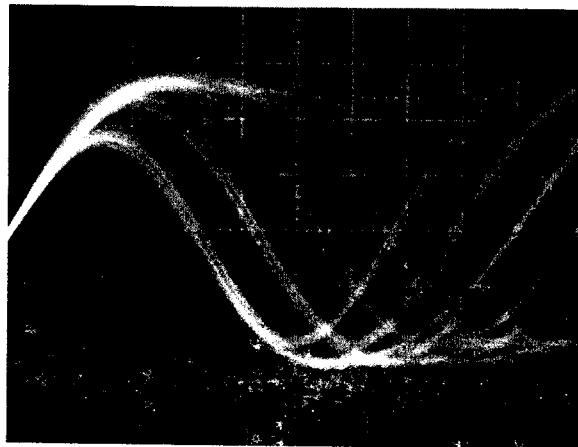


NG Fig. 24

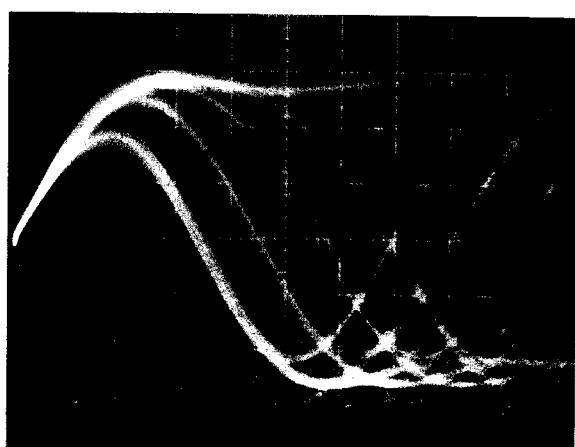
Play tune TNO 12 (TYPE4)

**Adjustment Procedure (without R379 removed)**

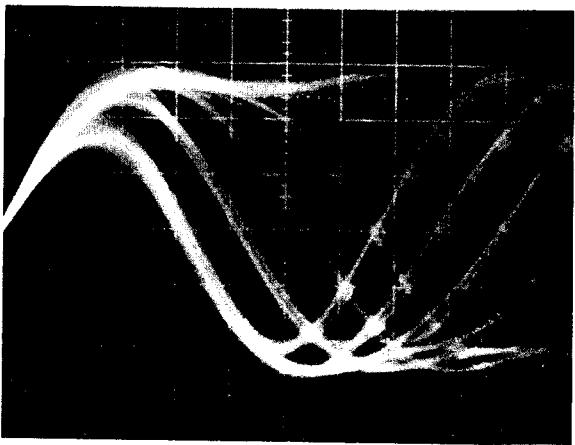
1. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates, and take the midway point as the adjustment point. As a general guide, look for an overall clear waveform, and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig. 25-27)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew, also adjust the grating.



NG Fig. 25



OK Fig. 26



NG Fig. 27

## 8. 8 Grating Adjustment

● Purpose: The grating may need adjustment in a replaced pick-up assembly.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/jigs	• Oscilloscope, clock driver, grating adjustment filter (bandpass filter) (GGF-133), AC millivoltmeter, two low-pass filters
● Measuring point	• TEY, E LPF output, F LPF output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• Pick-up grating adjustment hole

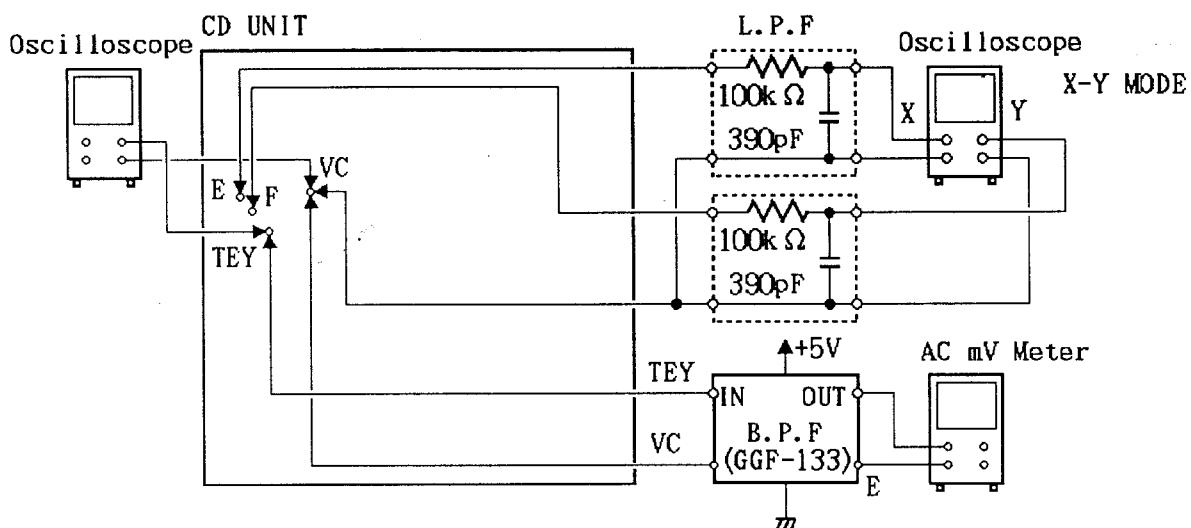


Fig. 28

### Adjustment Procedure

1. Connect a low-pass filter (100k, 390p) to test points E, F, and VC as shown in the above diagram.
2. Switch regulator ON in test mode, and load a disc.
3. Press the F2 key to close focus.
4. Press the F1 key to close tracking.
5. Using the + or - key, move the pick-up to about the center of the signal surface (tune TNO 6). (TYPE 3:TNO 7)
6. Press the F1 key to open tracking.
7. While monitoring the TEY filter output by AC milli-voltmeter, turn the grating adjustment hole slowly. The AC voltage increases and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track, and is referred to as the null point.)
8. Then while monitoring TEY by oscilloscope, turn the driver slowly clockwise from the null point (as seen from under the pick-up) until the first waveform peak amplitude is reached. (See Fig. 30-35)

9. With the E low-pass filter output connected to the X axis of the oscilloscope, and the F low-pass filter output connected to the Y axis, apply an input in AC mode and observe the Lissajous figures.

10. Using the driver, adjust the Lissajous figure to a single line (or as close as possible)

11. Switch regulator OFF and remove the filters.

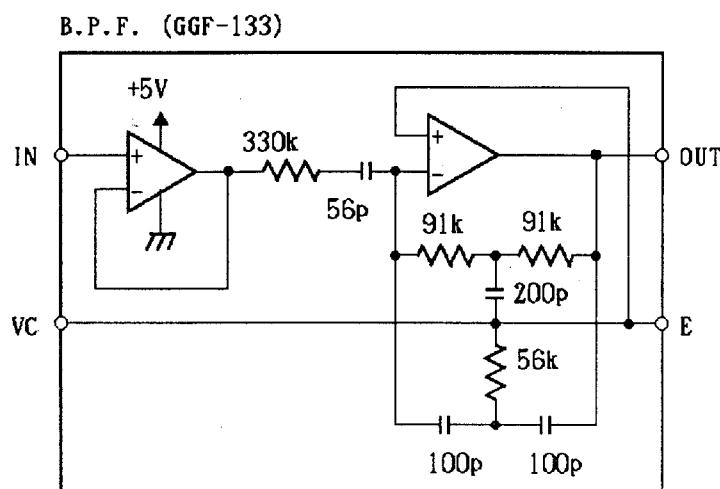


Fig. 29

TEY waveform 10ms/div, 500mV/div

Null Point

Lissajous figure (AC input)  
Horizontal axis E 20mV/div  
Vertical axis F 20mV/div

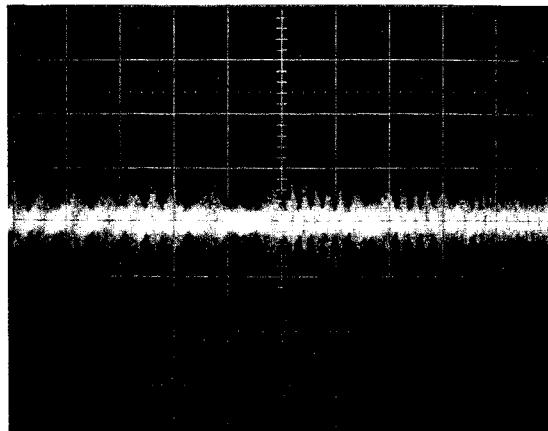


Fig. 30



"Rough" adjustment

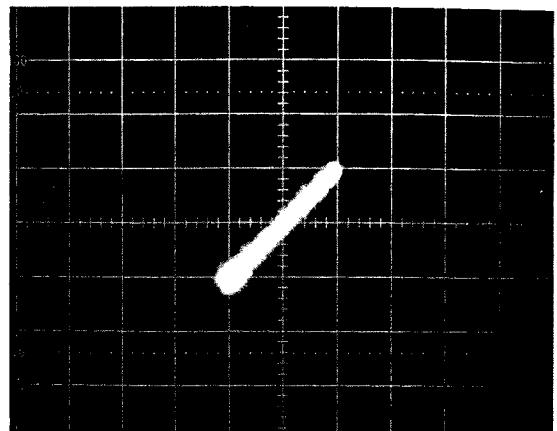


Fig. 31

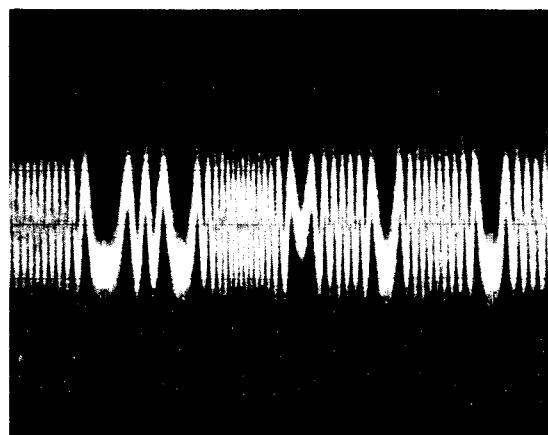


Fig. 32



Final adjustment

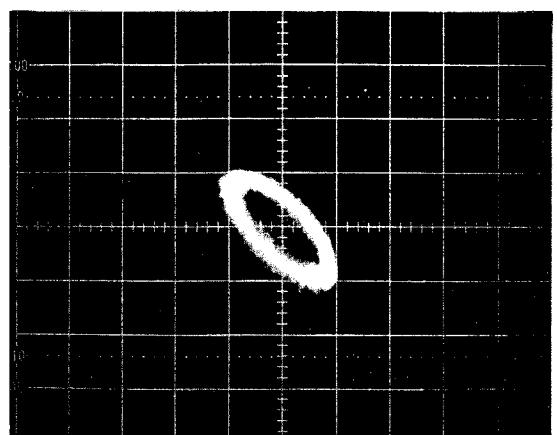


Fig. 33

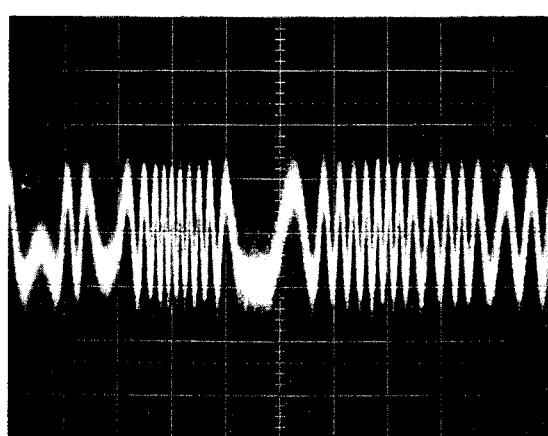


Fig. 34

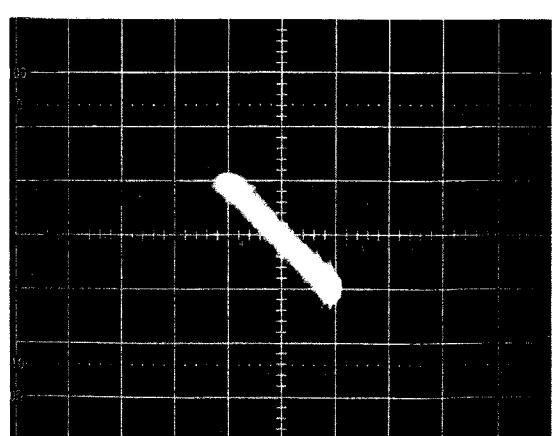


Fig. 35

## 8.9 Focus Bias Adjustment

- Purpose: To adjust the focus servo bias to an optimum value
- Maladjustment symptoms: Focus closing difficulty, poor playability

● Measuring equipment/jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3)
● Adjustment position	• Normal mode • VR6 (FEB)

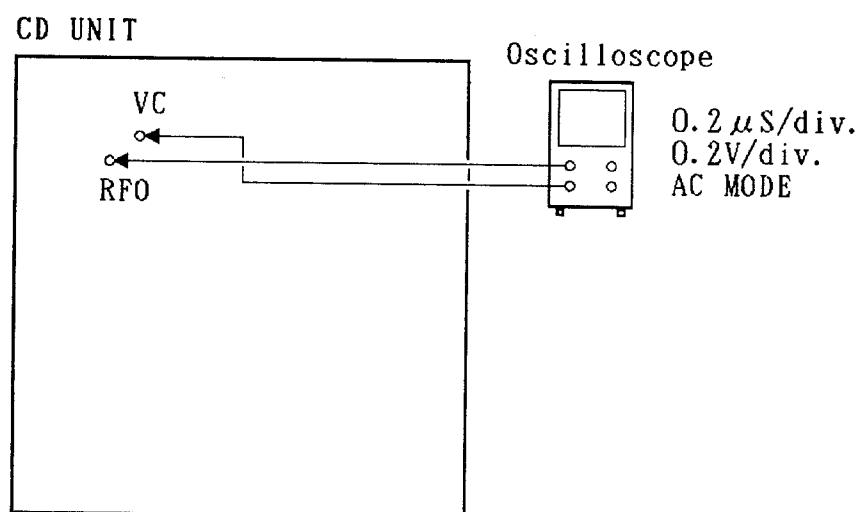
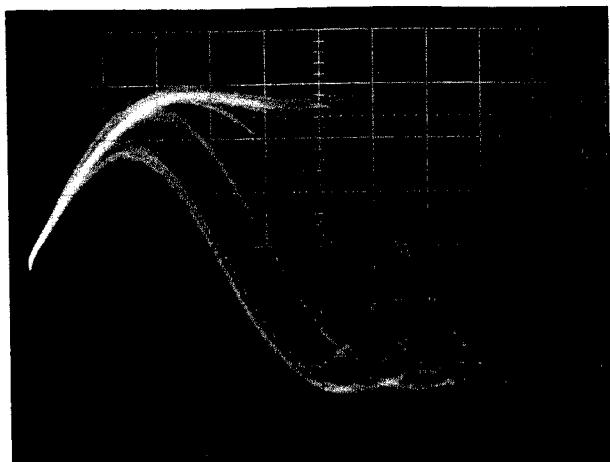


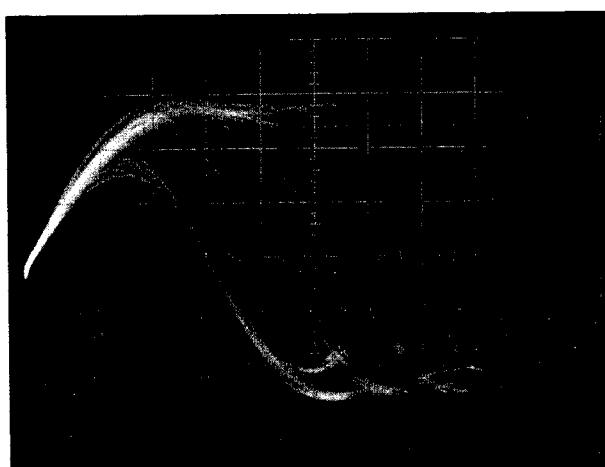
Fig. 36

## Adjustment Procedure

1. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
2. Observe RFO in respect to VC in the oscilloscope, and adjust VR6 (FEB) to obtain maximum RF and optimum eye pattern. (See Fig. 37 and 38)



OK Fig. 37

0.2 $\mu$ s/div. Before adjustment Fig. 38  
0.2V/div.  
AC Mode

## 8. 10 Focus Servo Loop Gain Adjustment

● Purpose: To adjust the focus servo loop gain to an optimum value	
● Maladjustment symptoms: Poor playability, reduced resistance to vibration, focus closure fails readily	
● Measuring equipment/jigs	• Oscillator, gain adjustment filter (GGF-065), dual meter millivoltmeter
● Measuring point	• FEX, FEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3)
● Adjustment position	• Normal mode • VR7 (FG)

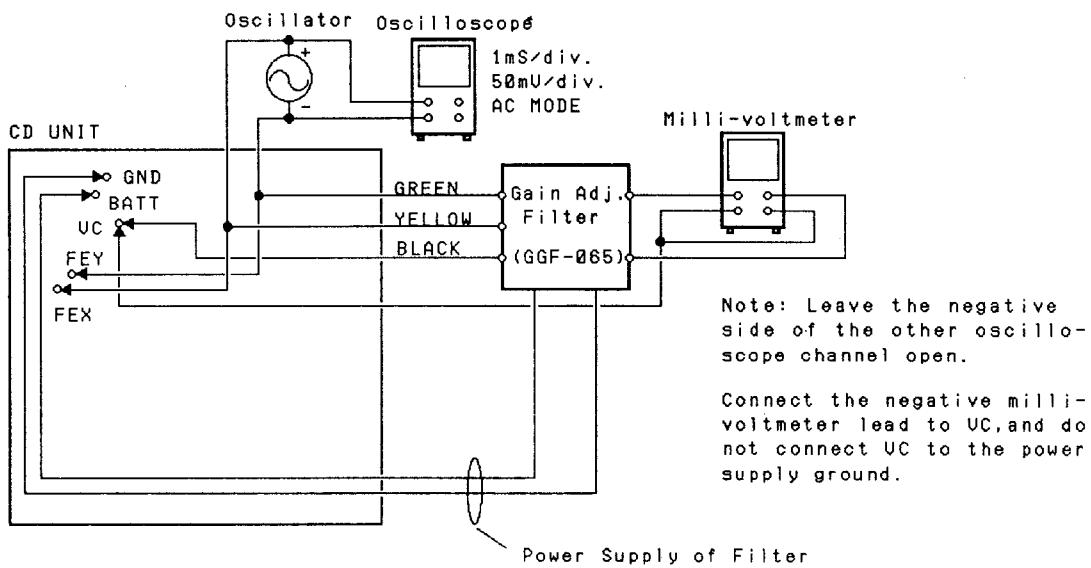


Fig. 39

## Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
3. Set the oscillator to 1kHz, and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 100mVp-p.
4. Adjust VR7 (FG) to obtain a milli-voltmeter difference of  $0 \pm 0.5$ dB.

## 8. 11 Tracking Servo Loop Gain Adjustment

● Purpose: To adjust the tracking servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration

● Measuring equipment/jigs	• Oscillator, gain adjustment filter (GGF-065), dual meter millivoltmeter
● Measuring point	• TEX, TEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR8 (TG)

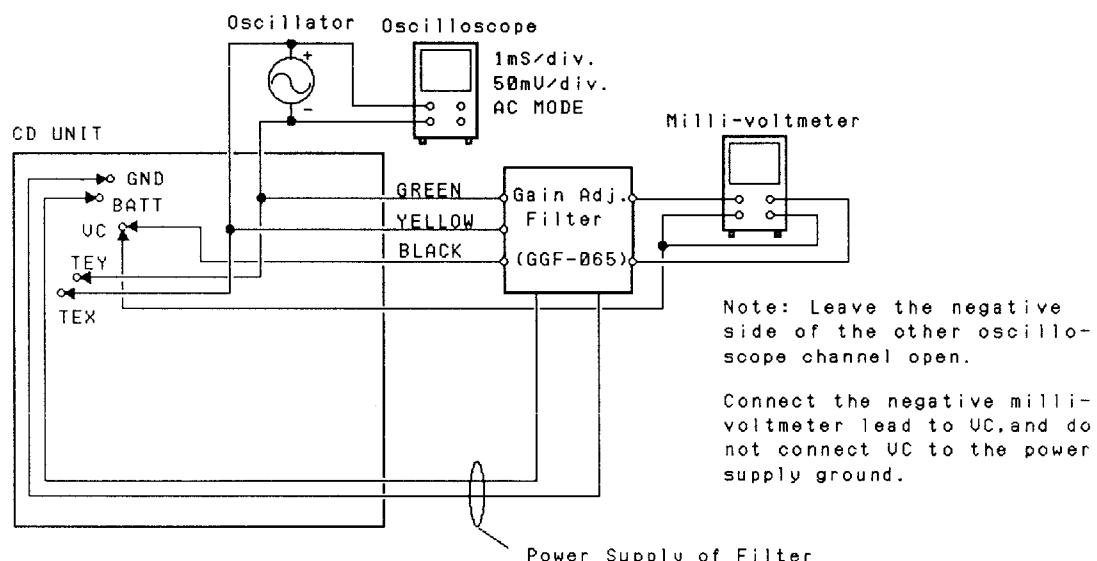


Fig. 40

## Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3:TNO 14)
3. Set the oscillator to 1.4kHz, and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 100mVp-p.
4. Adjust VR8 (TG) to obtain a milli-voltmeter difference of  $0 \pm 0.5$ dB.

## 8.12 TE Offset Adjustment-II

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR4

**Adjustment Procedure**

Same as for TE offset adjustment- I, but with the DC voltage of the TAO LPF output adjusted to  $0 \pm 50\text{mV}$ .

The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracking balance and tracking servo loop gain adjustments after completing TE offset adjustment- I.

## 8.13 Tracking Balance Adjustment-II

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/jigs	• Oscilloscope
● Measuring point	• TEY low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3)
● Adjustment position	• Test mode • VR5

**Adjustment Procedure**

Steps 1 thru 5 same as tracking balance adjustment-I.

6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig. 15-17). If greater than 5%, adjust with VR5.

7. If further adjustment was necessary in step 6, repeat TE offset adjustment-II.

## 8.14 Clock Adjustment

● Purpose: To adjust the clock frequency to a suitable value

● Measuring equipment/jigs	• Frequency counter
● Measuring point	• MWR
● setting	• Clock adjustment mode
● Adjustment position	• TC751

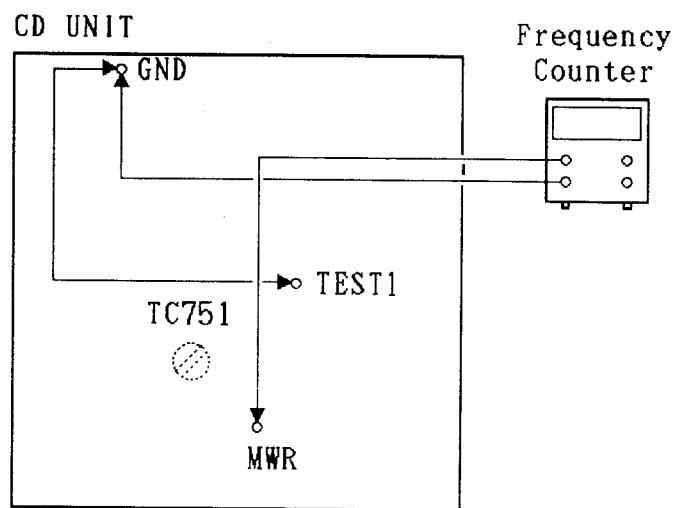


Fig. 41

## Adjustment Procedure

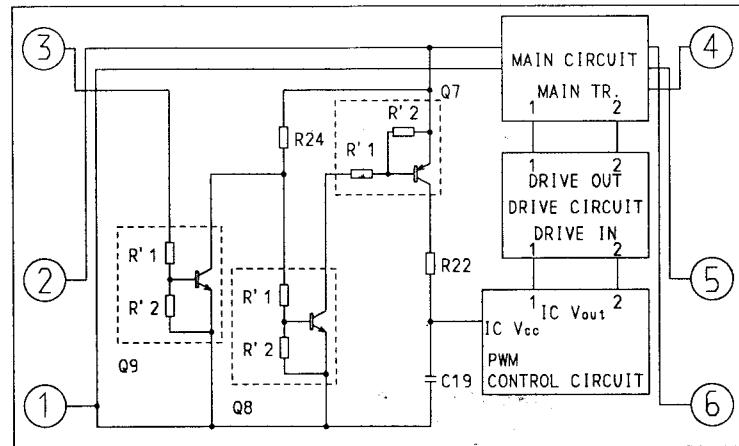
1. Switch ACC, BACK-UP ON.
2. Connect TEST1 to GND. (Clock adjustment mode)
3. Connect the frequency counter to MWR.
4. Adjust TC751 to obtain a frequency of  $1,048,576\text{Hz} \pm 20\text{Hz}$ .

## ● ICs

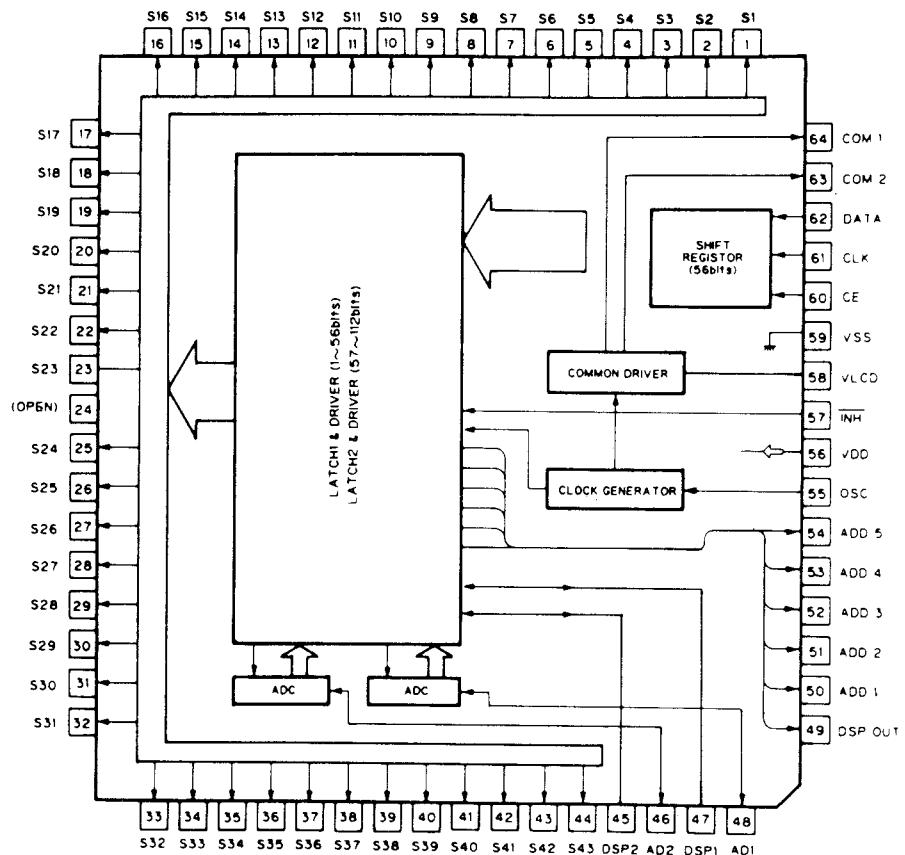
IC's marked by \* are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.

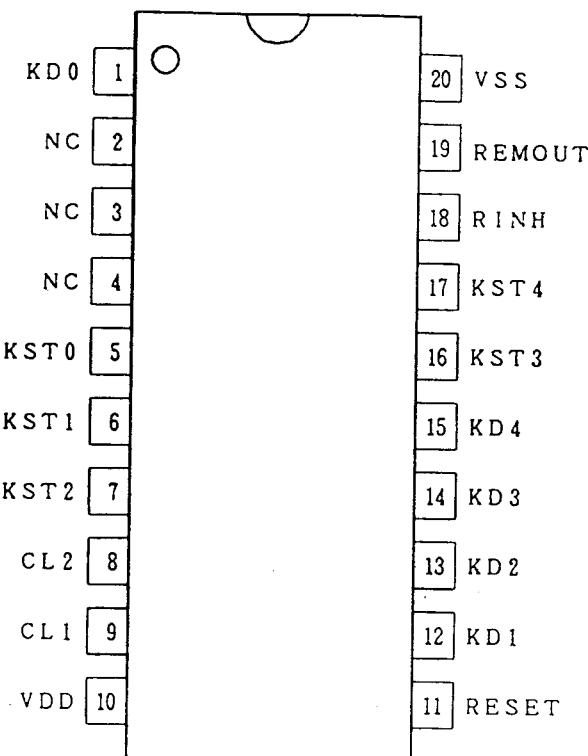
IC982 : KHAA02



\*IC901, 902:LC7582ASP



IC903:PD4285

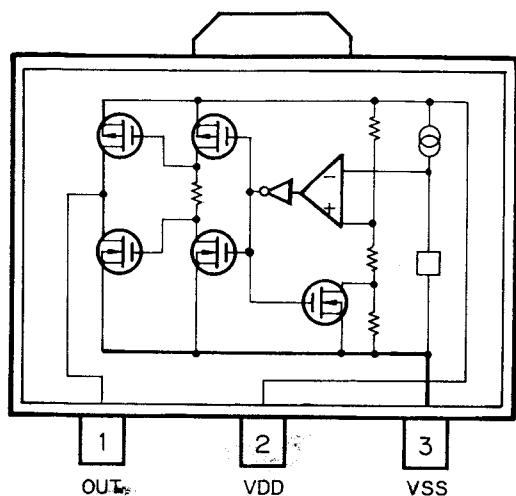


- Pin Functions (PD4285)

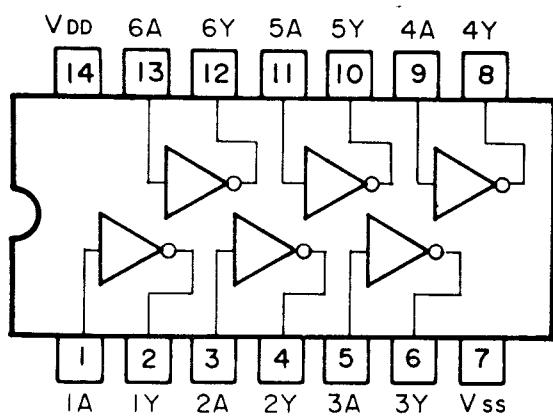
Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	KDD	INPUT		Key return input
2-4	NC			
5-7	KST0-KST2	OUTPUT	NM	Key strobe output
8	CL2			System clock generator connector pin
9	CL1			System clock generator connector pin
10	VDD			
11	RESET	INPUT		Reset input
12-15	KD1-KD4	INPUT		Key return input
16, 17	KST3, KST4	OUTPUT	NM	Key strobe output
18	RINH	OUTPUT	NM	Remote controller OFF output when key data is outputed
19	REMOUT	OUTPUT	NM	Remote controller data output
20	VSS			GND

Output Format	Meaning
NM	Neutral resistivity N channel open drain

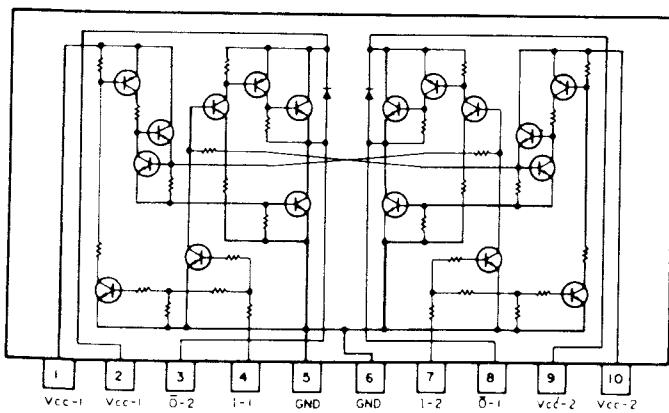
IC904: S-80740AH-B4



IC202:TC74HCU04AF

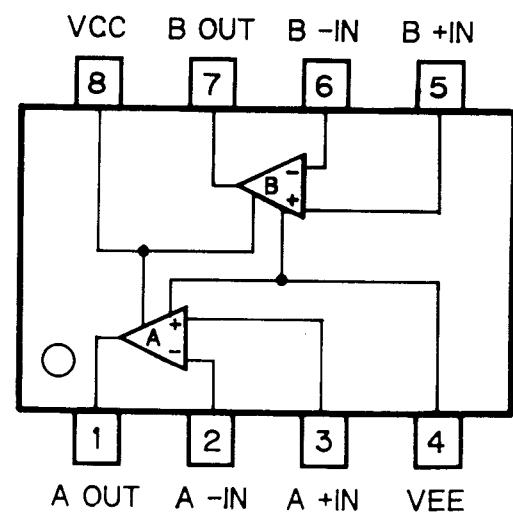


IC502: M54546AL

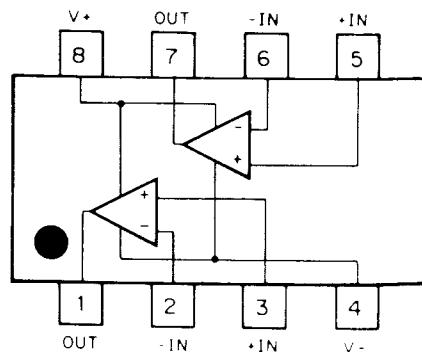


IC203:NJM3404AM

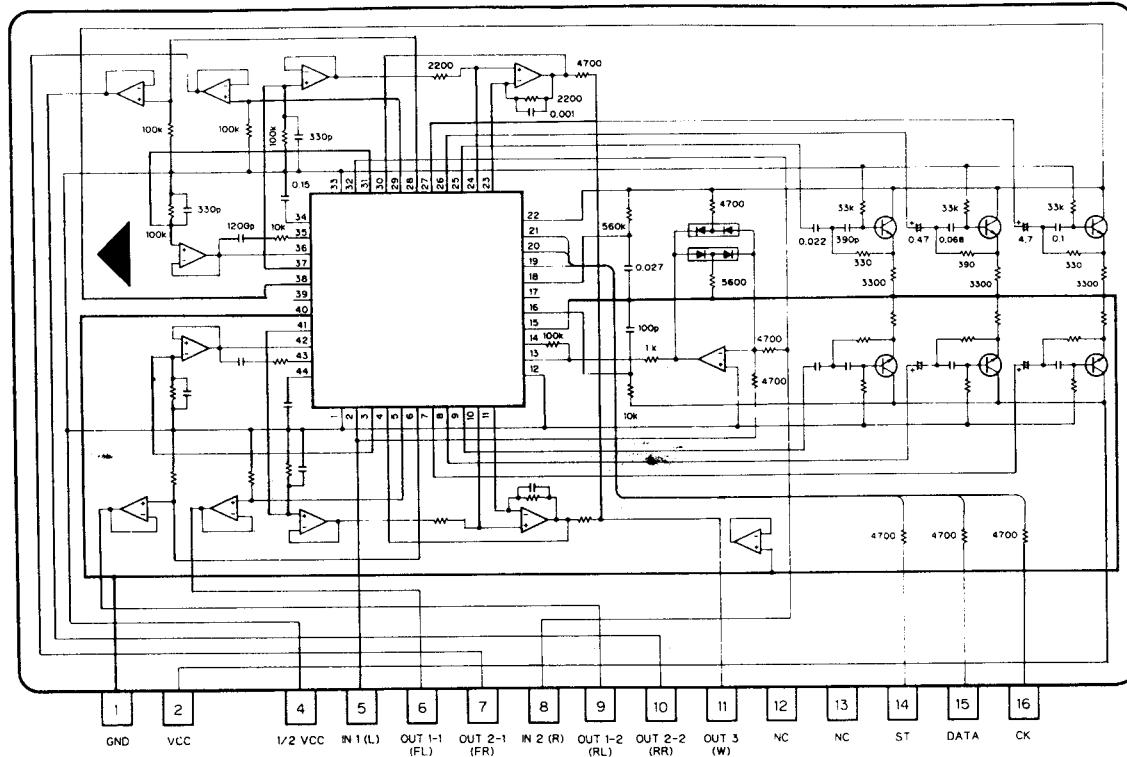
IC453,454,712,851-853:RC2068MD1



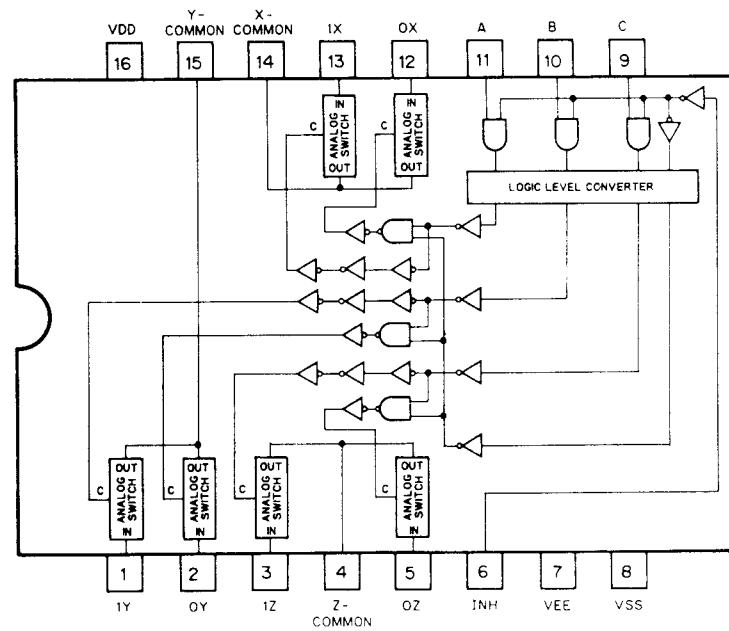
IC662:M5218FP



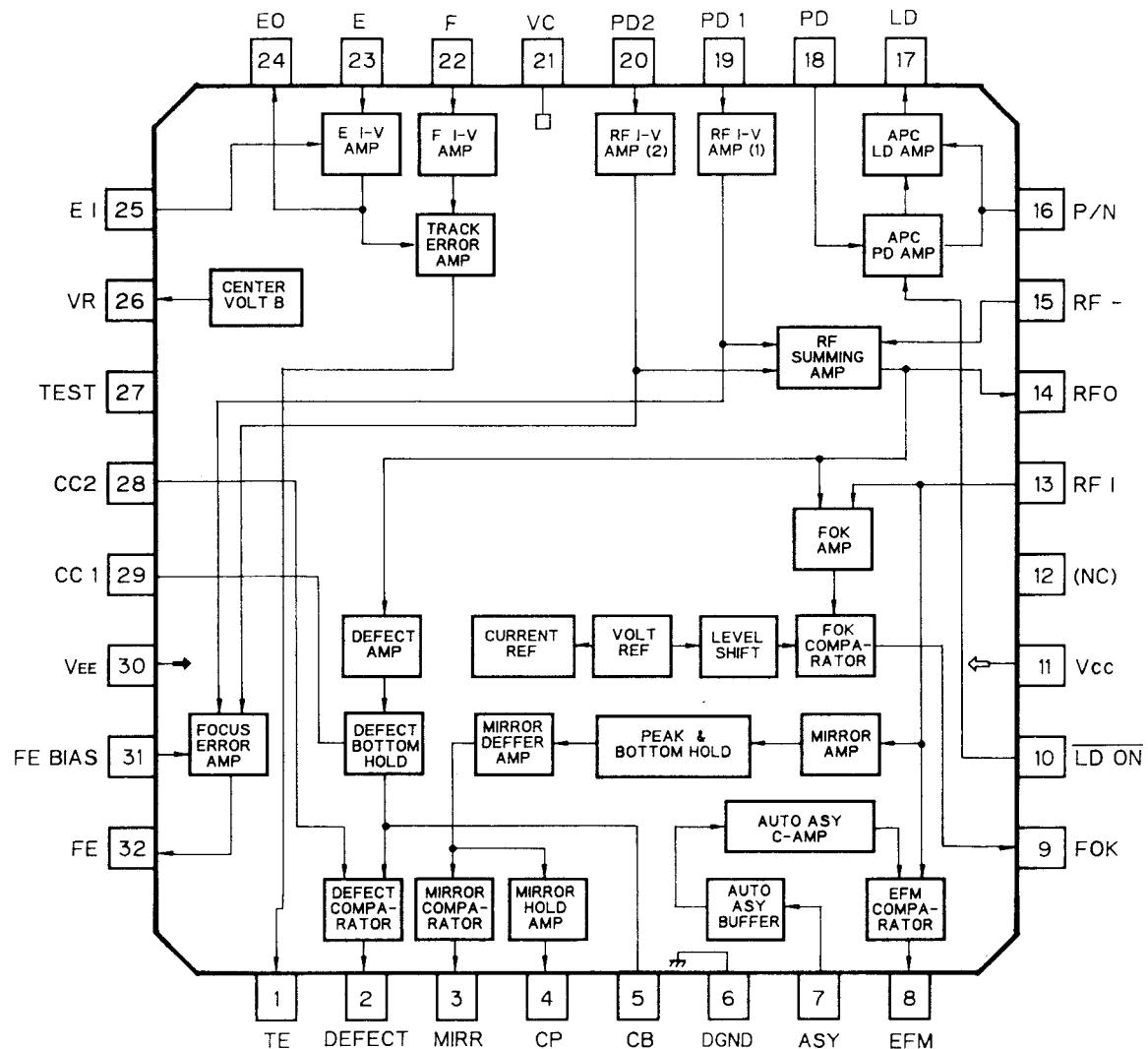
IC451 : KHA176



IC452 : TC4053BF



\*IC351:CXA1081Q

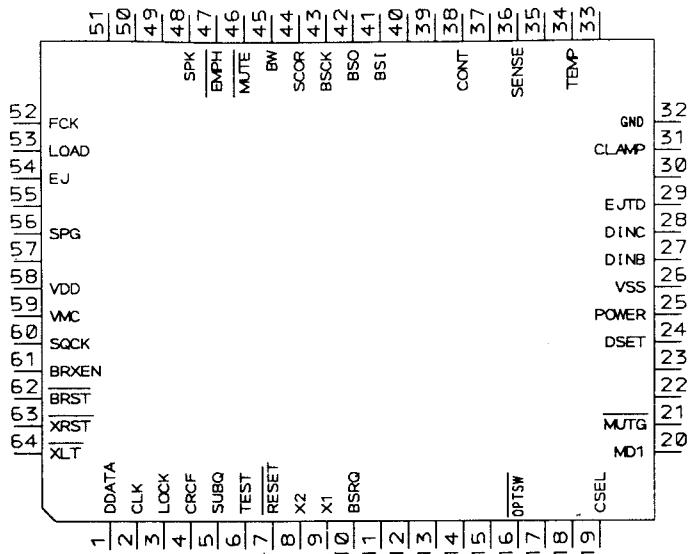


IC's marked by \* are MOS type.  
 Be careful in handling them because they are very  
 liable to be damaged by electrostatic induction.

## ● Pin Functions (CXA1081Q)

Pin No.	Pin. Name	I/O	Function and Operation
1	TE	Output	Tracking error amplifier output pin
2	DEFECT	Output	DEFECT comparator output pin
3	MIRR	Output	MIRR comparator output pin
4	CP	Input	MIRR hold capacitor connector pin - MIRR comparator non-inverting input pin
5	CB	Input	DEFECT bottom hold capacitor connector pin
6	DGND		Ground connection
7	ASY	Input	Auto asymmetry control input pin
8	EFM	Output	EFM comparator output pin
9	FOK	Output	Focus OK comparator output pin
10	LDON	Input	Laser diode ON/OFF switching
11	VCC		Positive power supply pin
12	NC		
13	RF1	Input	Input of capacitance-coupled RF summing amplifier output
14	RFO	Output	RF summing amplifier output pin - eye pattern check point
15	RF-	Input	RF summing amplifier feedback input pin
16	P/N	Input	Laser diode P-sub/N-sub selector pin
17	LD	Output	APC LD amplifier output pin
18	PD	Input	APC PD amplifier input pin
19	PD1	Input	RF I-V amplifier (1) inverter input pin - connected to photodiode A + C pin for current input
20	PD2	Input	RF I-V amplifier (2) inverter input pin - connected to photodiode B + D pin for current input
21	VC		Connected to VR
22	F	Input	I-V amplifier inverter input pin - connected to photodiode for current input
23	E	Input	I-V amplifier inverter input pin - connected to photodiode for current input
24	EO	Output	E I-V amplifier output pin
25	EI	Input	E I-V amplifier feedback input for E I-V amplifier gain adjustment
26	VR	Output	$(V_{CC} + V_{EE})/2$ DC voltage output pin
27	TEST		Open
28	CC2	Input	Input of capacitance-coupled DEFECT bottom hold output
29	CC1	Output	DEFECT bottom hold output pin
30	VEE		Ground connection
31	FE BIAS	Input	Focus error amplifier non-inverting bias pin Used in focus error amplifier CMR adjustment
32	FE	Output	Focus error amplifier output pin

\*IC501:PD4247



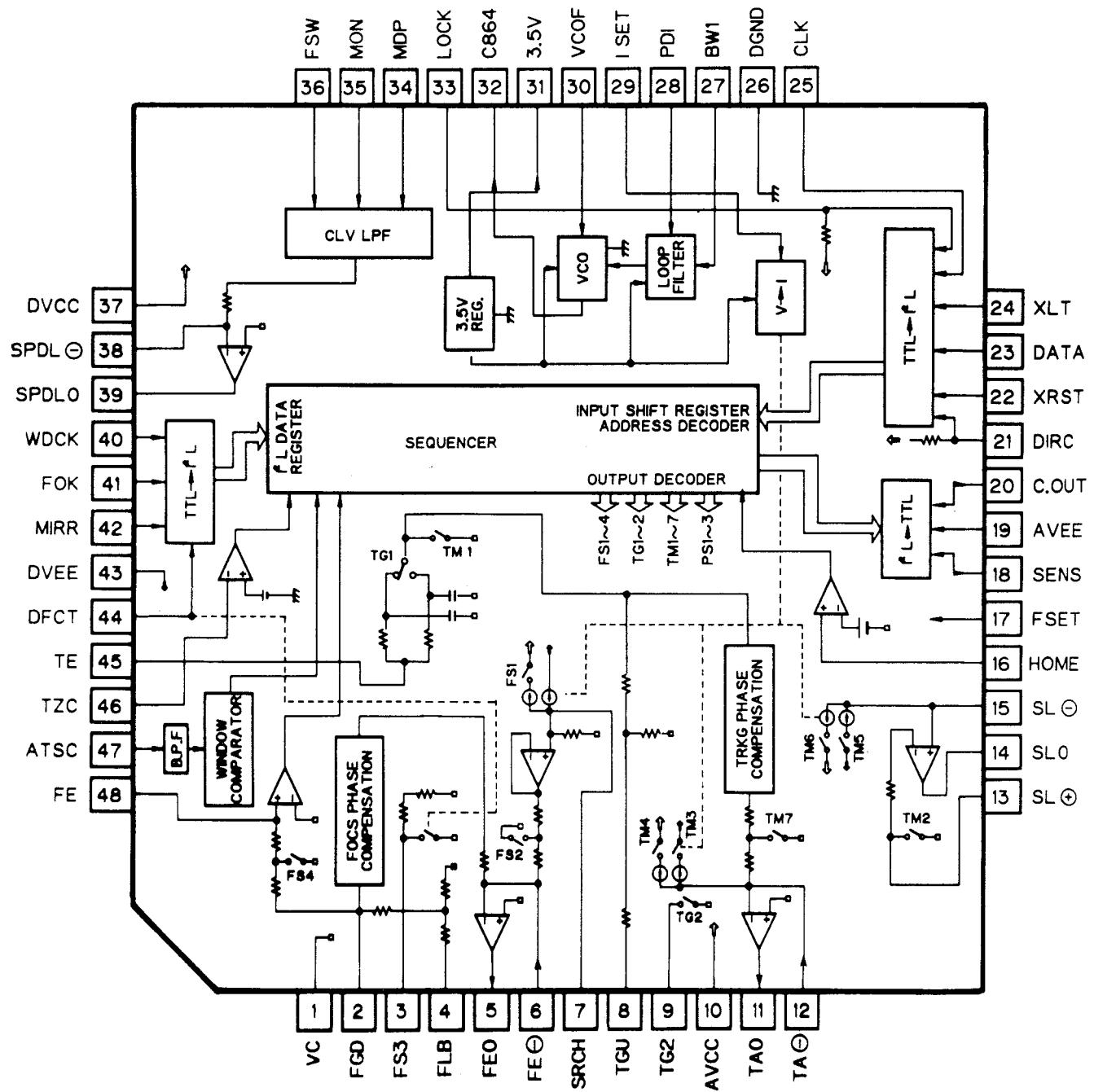
• Pin Function (PD4247)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	DDATA	Output	C	Serial data output. H:1, L:0
2	CLK	Output	C	Serial data clock output.
3	LOCK	Input		Spindle lock monitor.
4	CRCF	Input		CRC check result input. H:CRC check OK.
5	SUBQ	Input		Sub-code data input. H:1, L:0
6	TEST	Input		Test program input
7	RESET			Reset
8	X2	Output		Oscillator output.
9	X1	Input		Oscillator input.
10	BSRQ	Output	C	Bus polling request line.
11	NC			
15				
16	OPTSW	Input		Optical cable connection detector switch input.
17	NC			
18	NC			
19	CSEL	Output	C	Analog switch CD select output.
20	MD1	Output	C	ROM/AUDIO switching output.
21	MUTG	Output	C	DSP mute output.
22	NC			
23	NC			
24	DSET	Output	C	Disc set LED output.
25	POWER	Output	C	Regulator control output.
26	VSS	Input		
27	DINB	Input		Disc sensor B input.
28	DINC	Input		Disc sensor C input.
29	EJTD			Disc eject sensor (12cm).
30	NC			
31	CLAMP	Input		Disc clamped input.
32	GND			
33	NC			

Pin No.	Pin Name	I/O	Output Format	Function and Operation
34	TEMP	Input		High temperature detector input.
35	NC			
36	SENSE	Input		CD LSI internal status monitor input.
37	NC			Open
38	CONT	Output	C	Linear driver ON/OFF control output. H:ON
39	NC			
40	NC			
41	BSI	Input		Bus data input.
42	BSO	Output		Bus data output.
43	BSCK	Output		Bus shift clock output.
44	SCOR	Input		Sub-code synchronization input.
45	BW	Output	NM	Spindle motor output filter time constant selection output.
46	MUTE	Output	NM	Mute output.
47	EMPH	Output	NM	Emphasis selector output.
48	SPK	Output	NM	Spindle kick gain switching.
49	NC			
51				
52	FOK	Input		Indication that focus is closed and RF input is active.
53	LOAD	Output	NM	Loading motor driver control output.
54	EJ	Output	NM	Loading motor driver control output.
55	NC			
56	SPG	Output	NM	Spindle gain switching. L:8cm, H:12cm
57	NC			
58	VDD			VDD
59	VMC	Output	C	Loading motor driver power supply.
60	SQCK	Output	C	Sub-code clock.
61	BRXEN	Input/Output	C	Bus reception enable/disable output.
62	BRST	Input		Bus reset input.
63	XRST	Output	C	CD LSI reset output. L:reset
64	XLT	Output	C	Serial data latch output. L:latch active

Output Format	Meaning
C	C-MOS
NM	Neutral resistivity N channel open drain

\*IC601:CXA1082BQ

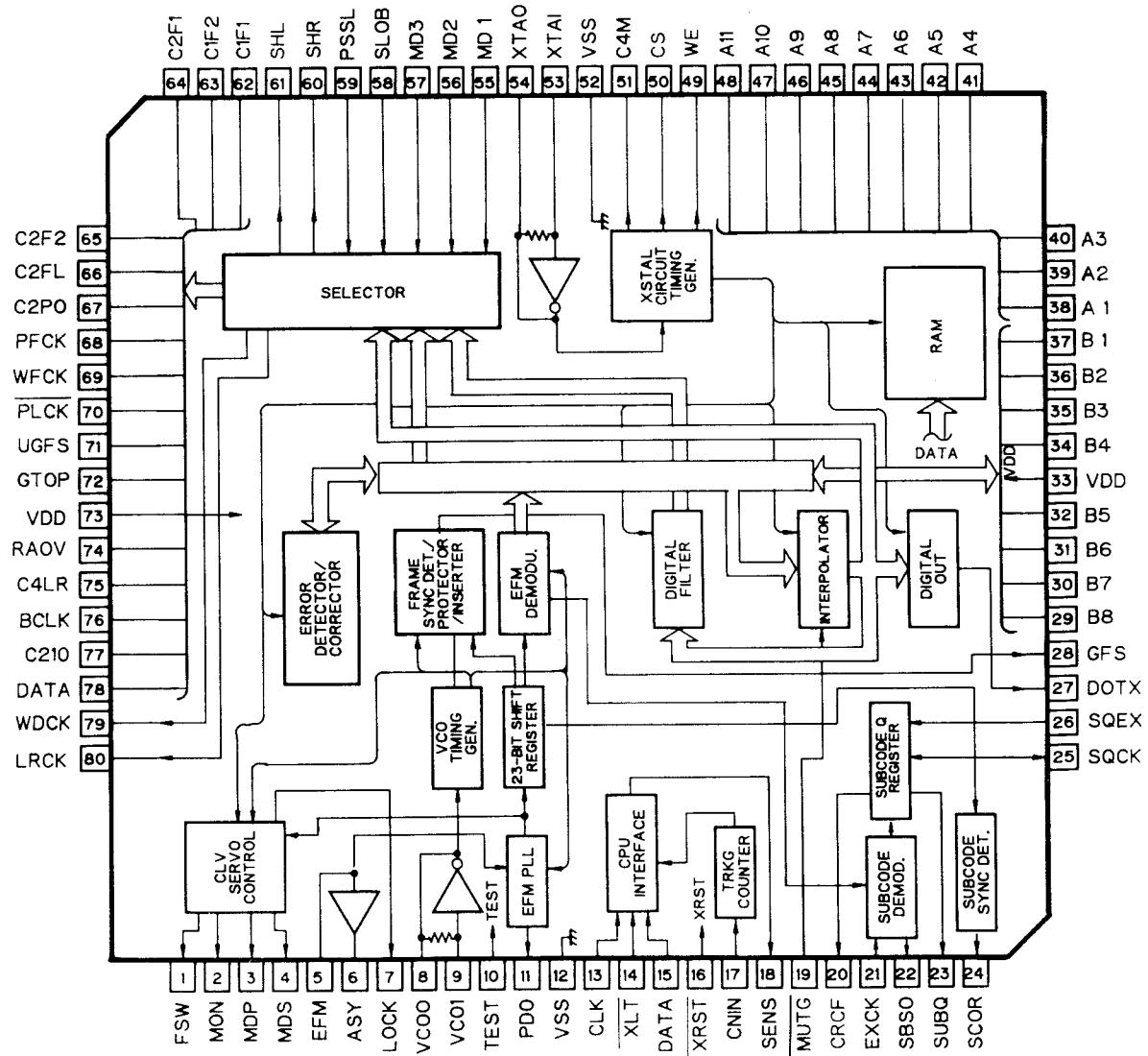


## ● Pin Functions (CXA1082BQ)

Pin No.	Pin Name	I/O	Function and Operation
1	VC		Servo reference voltage input pin
2	FGD		Connect to pin 3 to switch focus servo OFF when defect occurs
3	FS3		Internal DFCT switch closed when pin 44 is high
4	FLB		Focus servo low region boost external time constant pin
5	FEO	Output	Focus drive output - connect to low-end equalizer
6	FE-	Input	Focus amplifier inverter input pin
7	SRCH		Focus search waveform generation external time constant connector pin
8	TGU	Output	Tracking low-end equalizer connection output pin
9	TG2		Pin 7 discharge switch for starting focus search from lens center
10	AVCC		+ 5V connection
11	TAO	Output	Tracking drive output
12	TA-	Input	Tracking amplifier inverter input pin
13	SL +	Input	Sled amplifier non-inverting input pin
14	SLO	Output	Sled drive output
15	SL -	Input	Sled amplifier inverter input pin
16	HOME	Input	Sled home position detector switch input pin
17	FSET		Focus/tracking phase compensation peak and CLV low-pass filter $f_0$ setting pin
18	SENS	Output	Output of FZC, AS, TZC, SSTOP, and BUSY depending on command from CPU
19	AVEE		AGND connection
20	COUT	Output	Track counter signal output
21	DIRC		Not used
22	XRST	Input	Reset input pin - reset when "L"
23	DATA	Input	Serial data input from CPU
24	XLT	Input	Latch input from CPU
25	CLK	Input	Serial data transfer clock input from CPU
26	DGND		DGND connection
27	BW1		Loop filter external time constant pin
28	PDI	Input	Input of CXD1135 phase comparator output PDO
29	ISET		Current which determines focus search, track jump, and sled kick height
30	VCOF		VCO free-running frequency more or less inversely
31	3.5V	Output	Proportional to resistance value between pins 30 and 31
32	C864	Output	8.64MHz VCO output pin
33	LOCK		Not used
34	MDP		Connect to MDP pin of CXD1135
35	MON		Connect to MON pin of CXD1135
36	FSW		CLV servo error signal low-pass filter external time constant pin
37	DVCC		+ 5V connection
38	SPDL -	Input	Spindle drive amplifier inverter input pin

Pin No.	Pin Name	I/O	Function and Operation
39	SPDLO	Output	Spindle drive output
40	WDCK	Input	Auto-sequence clock input 176.4kHz
41	FOK	Input	FOK signal input pin
42	MIRR	Input	Mirror signal input pin
43	DVEE		DGND connection
44	DFCT	Input	DEFECT signal input pin - defect countermeasure circuit activated when this input is high
45	TE	Input	Tracking error signal input pin
46	TZC	Input	Tracking zero-cross comparator input pin
47	ATSC	Input	Tracking lens offset detector window comparator input pin
48	FE	Input	Focus error signal input pin

\*IC701:CXD1167Q



## ● Pin Functions (CXD1167Q)

Pin No.	Pin Name	I/O	Function and Operation
1	FSW	Output	Spindle motor output filter time constant selector output
2	MON	Output	Spindle motor ON/OFF control output
3	MDP	Output	Spindle motor drive output - "rough" control in CLV-S mode, and phase control in CLV-P mode
4	MDS	Output	Spindle motor drive output - speed control in CLV-P mode
5	EFM	Input	EFM signal input from RF amplifier
6	ASY	Output	EFM signal slice level control output
7	LOCK	Output	Sampling of GFS signal by WFCK/16 - "H" output if "H", "L" output if "L" detected eight times in succession
8	VCOO	Output	VCO output - $f = 8.6436\text{MHz}$ when EFM signal is locked
9	VCOI	Input	VCO input
10	TEST	Input	(OV)
11	PDO	Output	EFM signal and VCO/2 phase comparison output
12	V <sub>ss</sub>	—	Ground (OV)
13	CLK	Input	Serial data transfer clock input from CPU - data latched by clock leading edge
14	XLT	Input	Latch input from CPU - 8-bit shift register data (serial data from CPU) is latched in each register.
15	DATA	Input	Serial data input from CPU
16	XRST	Input	System reset signal input - reset when "L"
17	CNIN	Input	Tracking pulse input
18	SENS	Output	Output of internal status according to address
19	MUTG	Input	Muting input - when ATTM of internal register A is "L", MUTG "L" denotes normal status, and "H" muted status
20	CRCF	Output	Sub-code Q CRC check result output
21	EXCK	Input	Clock input for sub-code serial output
22	SBSO	Output	Sub-code serial output
23	SUBQ	Output	Sub-code Q output
24	SCOR	Output	Sub-code synchronizing S0 + S1 output
25	SQCK	Input/Output	Sub-code Q read clock
26	SQEX	Input	SQCK selector input
27	DOTX	Output	Digital out output (WFCK output)
28	GFS	Output	Frame synchronizing lock status indicator output
29	B8	Input	Connected to GND
30	B7	Input	Connected to GND
31	B6	Input	Connected to GND
32	B5	Input	Connected to GND
33	V <sub>DD</sub>	—	Power supply (+ 5V)
34	B4	Input	Connected to GND
35	B3	Input	Connected to GND

Pin No.	Pin Name	I/O	Function and Operation
36	B2	Input	Connected to GND
37	B1	Input	Connected to GND
38	A1	Input	Connected to GND
39	A2	Input	Connected to GND
40	A3	Input	Connected to GND
41	A4	Input	Connected to GND
42	A5	Input	Connected to GND
43	A6	Input	Connected to GND
44	A7	Input	Connected to GND
45	A8	Input	Connected to GND
46	A9	Input	Connected to GND
47	A10	Input	Connected to GND
48	A11	Input	Connected to GND
49	WE	Output	External RAM write enable signal output (active "L")
50	CS	Output	External RAM chip select signal output (active "L")
51	C4M	Output	X'tal frequency division output (f = 4.2336MHz)
52	V <sub>SS</sub>	—	Ground (0V)
53	XTAI	Input	Crystal oscillator Input
54	XTAO	Output	Crystal oscillator output
55	MD1	Input	Mode selector input 1
56	MD2	Input	Mode selector input 2
57	MD3	Input	Mode selector input 3
58	SLOB	Input	Audio data output code selector input - 2's complement output "L", offset binary output if "H"
59	PSSL	Input	Audio data output mode selector input - serial output if "L", parallel output if "H"
60	SHR	Output	Aperture correction control output - "H" when right channel
61	SHL	Output	Aperture correction control output - "L" when left channel
62	C1F1	Output	C1F1 output
63	C1F2	Output	C1F2 output
64	C2F1	Output	C2F1 output
65	C2F2	Output	C2F2 output
66	C2FL	Output	C2FL output
67	C2PO	Output	C2PO output
68	RFCK	Output	RFCK output
69	WFCK	Output	WFCK output
70	PLCK	Output	PLCK output
71	UGFS	Output	UGFS output
72	GTOP	Output	GTOP output

Pin No.	Pin Name	I/O	Function and Operation
73	V <sub>DD</sub>	—	Power supply (+ 5V)
74	RAOV	Output	RAOV output
75	C4LR	Output	C4LR output
76	<u>BCLK</u>	Output	C21O output
77	C21O	Output	C21O output
78	DATA	Output	DATA output
79	WDCK	Output	Strobe signal output
80	LRCK	Output	Strobe signal output

## Note:

C1F1: C1 decoding error correction status monitor output

C1F2:

C2F1: C2 decoding error correction status monitor output

C2F2:

C2FL: Corrected status output - "H" if C2 system currently being corrected cannot be corrected

C2PO: C2 pointer indication output - synchronized with audio data output

RFCK: Read frame clock output - crystal oscillator 7.35kHz

WFCK: Write frame clock output - f = 7.35kHz when crystal oscillator is locked

PLCK: VCO/2 output - f = 4.3218MHz when EFM signal is locked

UGFS: Unprotected frame synchronizing pattern output

GTOP: Frame synchronization protection status indicator output

RAOV: ± 4 frame jitter absorption RAM overflow and underflow indicator output

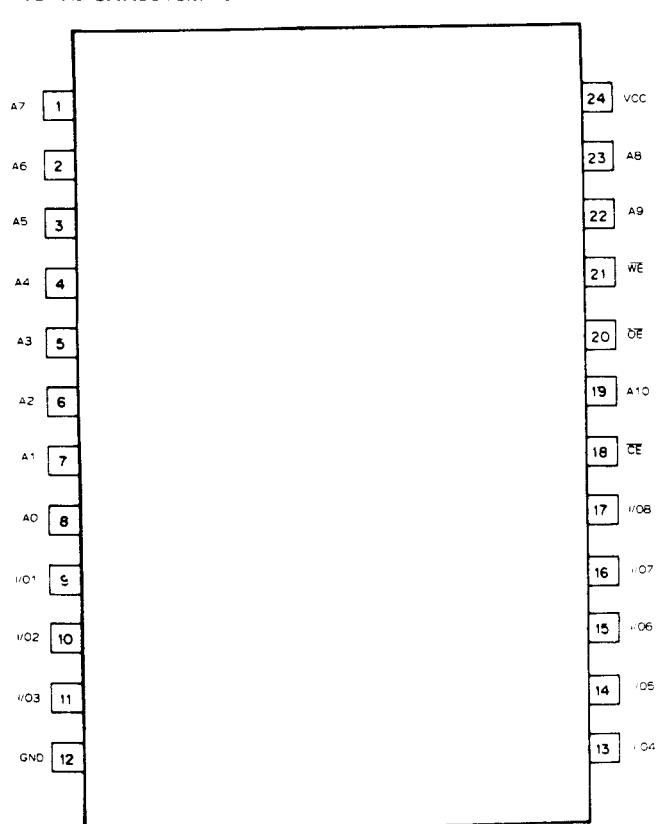
C4LR: Strobe signal

BCLK: C21O inverting output

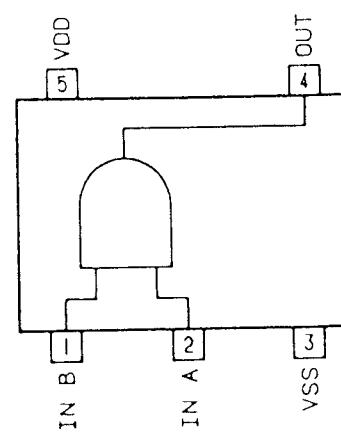
C21O: Bit clock output

DATA: Audio signal serial data output

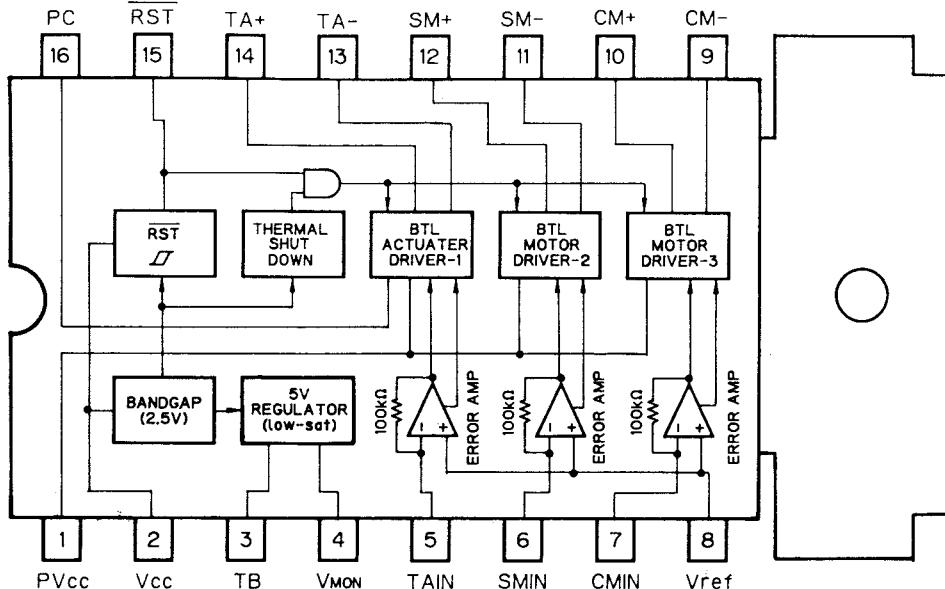
\*IC752: CXK5816M-15L



IC503:TC4S81F



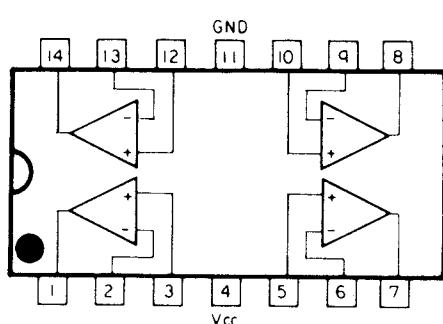
IC651:AN8377N



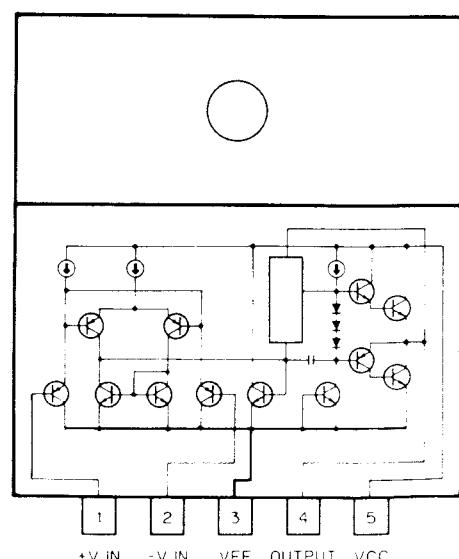
## • Pin Functions (AN8377N)

Pin	Pin name	I/O	Function and Operation
1	PVCC		Driver power supply
2	VCC		Power supply
3	TB	input	Transistor base input
4	VMON	output	5V regulator output
5	TAIN	input	Actuator driver 1 error input
6	SMIN	input	Motor driver 2 error input
7	CMIN	input	Motor driver 3 error input
8	VREF	input	Vref input
9	CM-	output	Motor driver 3 · inverter output
10	CM+	output	Motor driver 3 · non-inverting output
11	SM-	output	Motor driver 2 · inverter output
12	SM+	output	Motor driver 2 · non-inverting output
13	TA-	output	Actuator driver 1 · inverter output
14	TA+	output	Actuator driver 1 · non-inverting output
15	RST	output	Reset output
16	PC		PC input

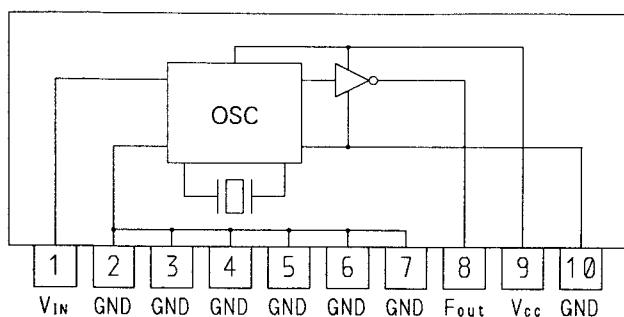
IC655:M5228FP



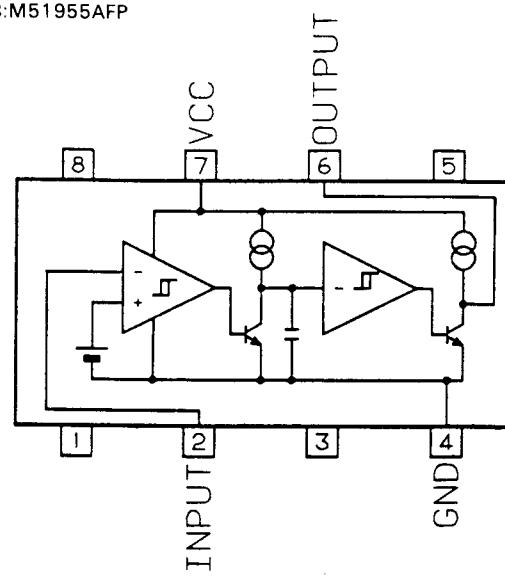
IC668,669:LA6501-FA



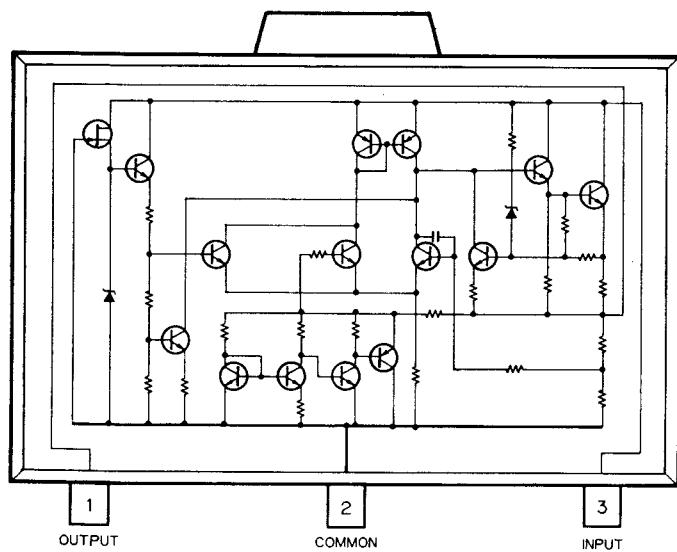
IC705:V-16M934-D110



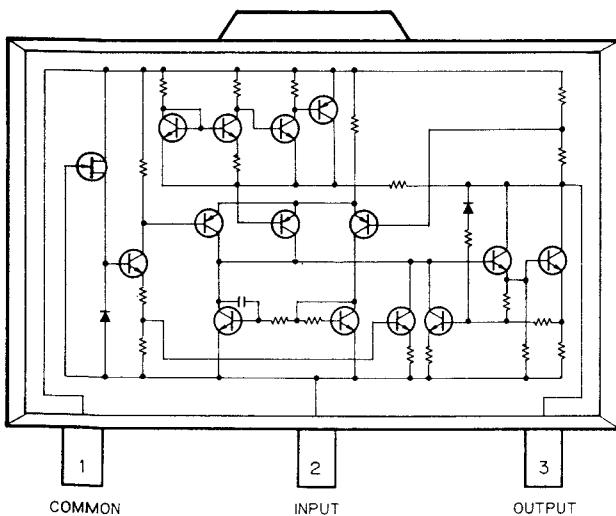
IC753:M51955AFP



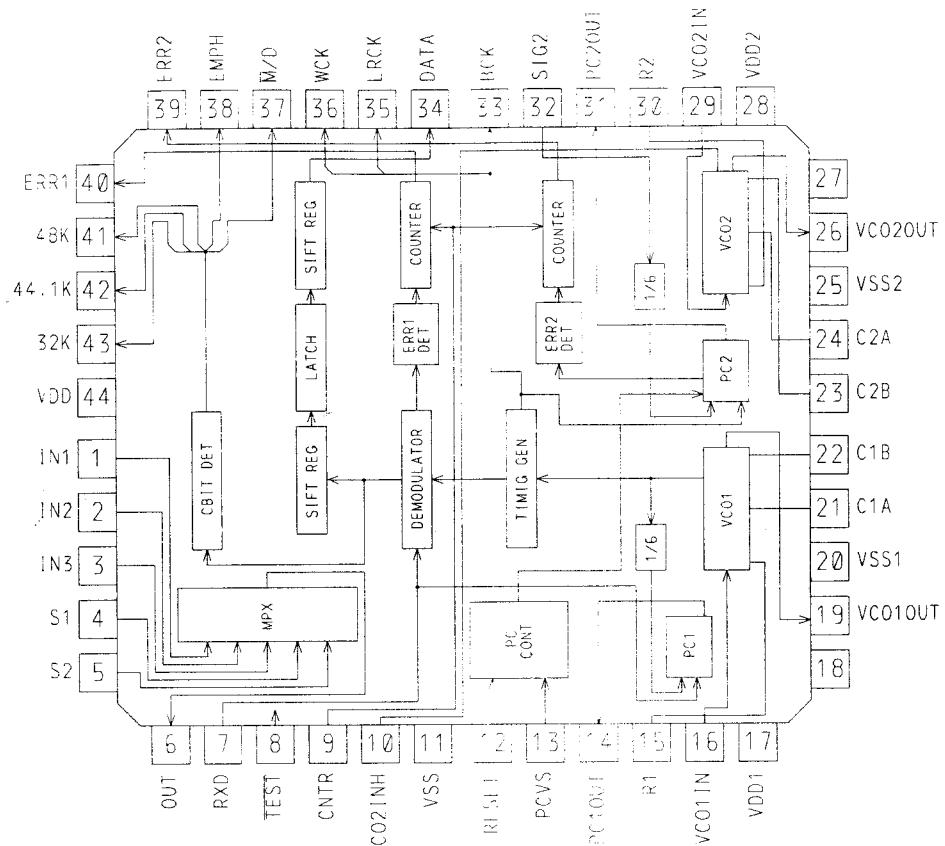
IC971:NJM78L05UA



IC972:NJM79L05UA



\*IC702:PD0075

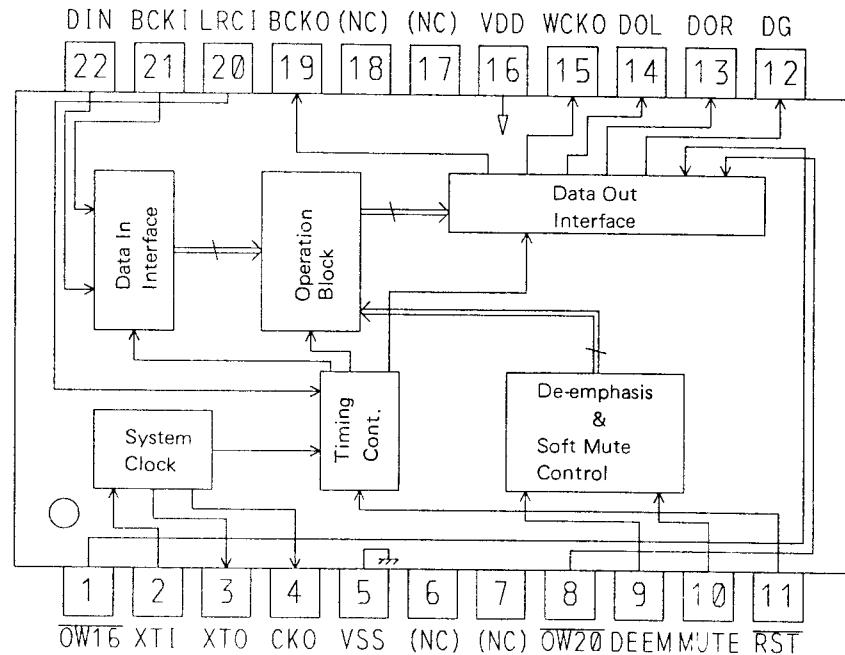


## • Pin Function (PD0075)

Pin No.	Pin Name	I/O	Function and Operation
1	IN1	Input	Data input 1.
2	IN2	Input	Data input 2.
3	IN3	Input	Data input 3.
4	S1	Input	Input selector 1. (TTL level)
5	S2	Input	Input selector 2. (TTL level)
6	OUT	Output	Data MPX output.
7	RXD	Input	Data input. Normally connected to OUT(CMOS level).
8	TEST	Input	Test mode input. Normally fixed at "H". (TTL level)
9	CNTR	Input	Counter clock input for ERR1/2 output time(CMOS level).
10	VCO2INH	Input	For VCO2 oscillation stop. Oscillation stop at "H". (TTL level)
11	VSS		Logic VSS.
12	RESET	Input	Power ON reset input.
13	PCVS	Input	VCO1/2 self-run frequency setting input.
14	PC1OUT	Output	Phase comparator 1 output.
15	R1		VCO1 regulating resistor connection terminal.
16	VCO1IN	Input	VCO1 control voltage input.
17	VDD1		VCO1 VDD.
18			Not used.
19	VCO1OUT	Output	VCO1 output. (384fs)
20	VSS1		VCO1 VSS.

Pin No.	Pin Name	I/O	Function and Operation
21	C1A		VC01 regulating capacity connection terminal.
22	C1B		VC01 regulating capacity connection terminal.
23	C2B		VC02 regulating capacity connection terminal.
24	C2A		VC02 regulating capacity connection terminal.
25	VSS2		VC02 VSS.
26	VC02OUT	Output	VC02 output. (384fs)
27			Not used.
28	VDD2		VC02 VDD.
29	VC02IN		VC02 control voltage input.
30	R2		VC02 regulating resistor connectin terminal.
31	PC2OUT	Output	Phase comparator 2 output.
32	SIG2	Input	V input of phase comparator 2. Normally connected to VC02OUT.
33	BCK	Output	Demodulation data bit clock output.
34	DATA	Output	Demodulation audio data output.
35	LRCK	Output	Demodulation data L/R channel output. L channel at "H".
36	WCK	Output	Demodulation data word clock output.
37	M/D	Output	MUSIC/DATA selection information output. MUSIC at "L"
38	EMPH	Output	Emphasis information output. With emphasis at "H".
39	ERR2	Output	2nd PLL UNLOCK output. UNLOCK at "H".
40	ERR1	Output	1st PLL data read error output. Error at "H".
41	48K	Output	Sampling frequency information output. Open drain for LED driver. Active at "L".
42	44.1K	Output	Sampling frequency information output. Open drain for LED driver. Active at "L".
43	32K	Output	Sampling frequency information output. Open drain for LED driver. Active at "L".
44	VDD		Logic VDD.

IC703:SM5840CS

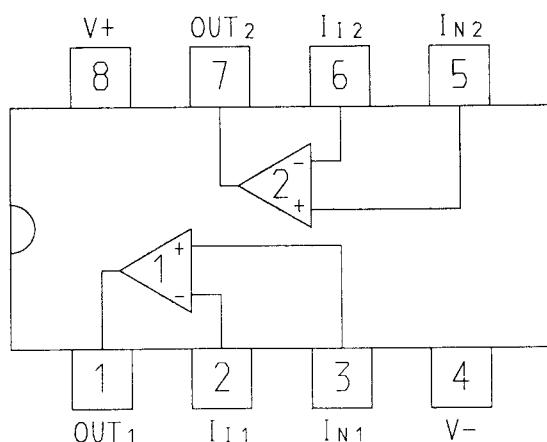


## • Pin Function (SM5840CS)

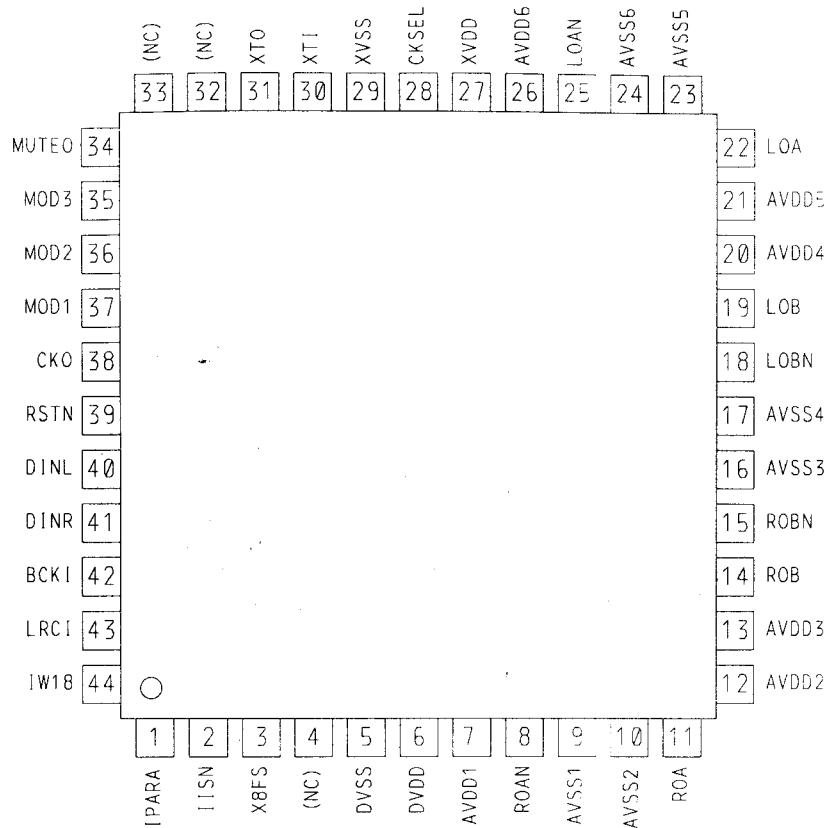
In the explanation,  $\langle fs \rangle$  means the sampling frequency of input data.

Pin No.	Pin Name	I/O	Function and Operation															
1	OW16	Input	Output bit number selection terminal. <table border="1" style="margin-left: 10px;"> <tr> <td colspan="2" style="text-align: center;">Setting</td> <td colspan="2" style="text-align: center;">OW20</td> </tr> <tr> <td rowspan="2" style="text-align: center; vertical-align: middle;">OW16</td> <td style="text-align: center;">H</td> <td style="text-align: center;">L</td> <td></td> </tr> <tr> <td style="text-align: center;">H</td> <td style="text-align: center;">18bit output (NS-ON)</td> <td style="text-align: center;">20bit output (NS-ON)</td> </tr> <tr> <td style="text-align: center;">L</td> <td style="text-align: center;">16bit output (NS-ON)</td> <td style="text-align: center;">18bit output (NS-OFF)</td> <td></td> </tr> </table>	Setting		OW20		OW16	H	L		H	18bit output (NS-ON)	20bit output (NS-ON)	L	16bit output (NS-ON)	18bit output (NS-OFF)	
Setting		OW20																
OW16	H	L																
	H	18bit output (NS-ON)	20bit output (NS-ON)															
L	16bit output (NS-ON)	18bit output (NS-OFF)																
2	XTI	Input	Oscillator input terminal.															
3	XT0	Output	Oscillator output terminal.															
4	CKO	Output	Oscillator output clock (frequency same as for XTI terminal)															
5	VSS		GND															
6, 7	NC																	
8	OW20	Input	Output bit number selection terminal 2. (20 bit for OW20=L) (18 bit for OW20=H)															
9	DEEM	Input	De-emphasis signal input. (De-emphasis OFF for DEEM=L) (De-emphasis ON for DEEM=H)															
10	MUTE	Input	Mute signal input. (Soft mute OFF for MUTE=L) (Soft mute ON for MUTE=H)															
11	RST	Input	System reset (initialize)															
12	DG	Output	Digridge output.															
13	DOR	Output	Rch data output.															
14	DOL	Output	Lch data output.															
15	WCKO	Output	Output word clock.															
16	VDD		VDD (5V)															
17, 18	NC																	
19	BCKO	Output	Output bit clock.															
20	LCR1	Input	Input data sample rate ( $fs$ ) clock.															
21	BCK1	Input	Input bit clock.															
22	DIN	Input	Input data.															

IC711:M5238FP



\*IC704:PD7008



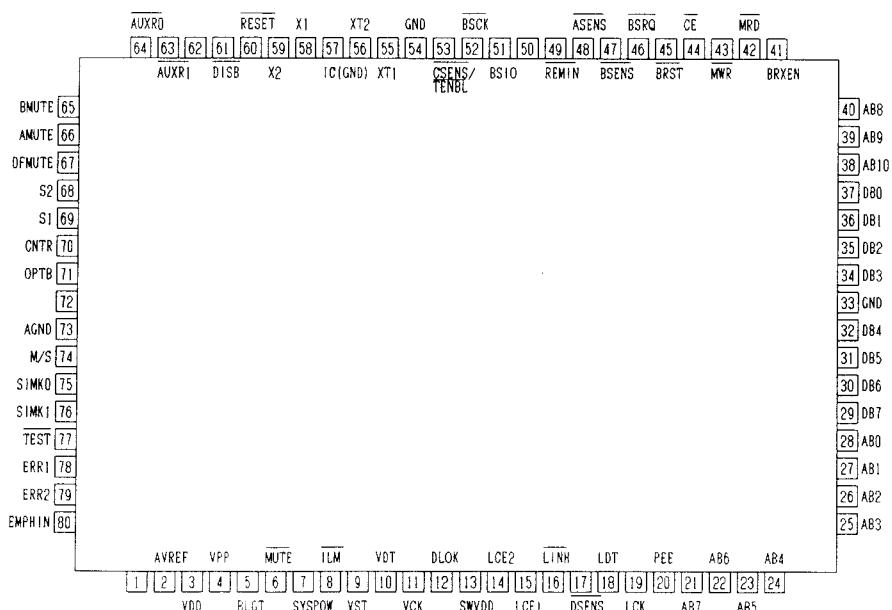
• Pin Function (PD7008)

Pin No.	Pin Name	I/O	Function and Operation
1	IPARA	Input	Input data word timing selection. H(or open):Lch/Rch parallel input. L:Lch/Rch alternate input.
2	IISN	Input	IIS input mode selection. H(or open):Normal input mode. L:IIS input mode.
3	X8SF	Input	Input data sample frequency selection. H(or open):8xfs input mode. L:4xfs input mode.
4	NC		
5	DVSS		Digital GND.
6	DVDD		Digital power supply(5V).
7	AVDD1		Analog power supply(5V) 1.
8	ROAN	Output	Data output. PWM output(Rch A reverse phase)
9	AVSS1		Analog GND 1.
10	AVSS2		Analog GND 2.
11	ROA	Output	Data output. PWM output(Rch A normal phase)
12	AVDD2		Analog power supply(5V) 2.
13	AVDD3		Analog power supply(5V) 3.
14	ROB	Output	Data output. PWM output(Rch B normal phase)
15	ROBN	Output	Data output. PWM output(Rch B reverse phase)
16	AVSS3		Analog GND 3.
17	AVSS4		Analog GND 4.
18	LOBN	Output	Data output. PWM output(Lch B reverse phase)
19	LOB	Output	Data output. PWM output(Lch B normal phase)
20	AVDD4		Analog power supply(5V) 4.
21	AVDD5		Analog power supply(5V) 5.

Pin No.	Pin Name	I/O	Function and Operation
22	LOA	Output	Data output. PWM output (Lch A normal phase)
23	AVSS5		Analog GND 5.
24	AVSS6		Analog GND 6.
25	LOAN	Output	
26	AVDD6		Analog power supply (5V) 6.
27	XVDD		Clock power supply (5V).
28	CKSEL	Input	L level fixing input.
29	XVSS		Clock GND.
30	XTI	Input	X'tal connection terminal/external clock input terminal.
31	XTO	Output	X'tal connection terminal.
32, 33	NC		
34	MUTE0	Output	Muting output.
35	MOD3		Selection of combination between system clock input frequency and noise shaper operation frequency.
37	MOD1	Input	
38	CK0	Output	256fs/384fs clock output.
39	RSTN	Input	Reset input.
40	DINL	Input	Lch serial data input.
41	DINR	Input	Rch serial data input.
42	BCKI	Input	Serial input data bit clock (data loading at rise edge).
43	LRC1	Input	Input data sample frequency clock.
44	IW18	Input	Input data word length selection. H (or open): 18 bit length. L: 16 bit length.

In the explanation, <fs> means the sample frequency (44.1kHz for CD) of the raw signal data.

\*IC751:PD4278



## • Pin Function (PD4278)

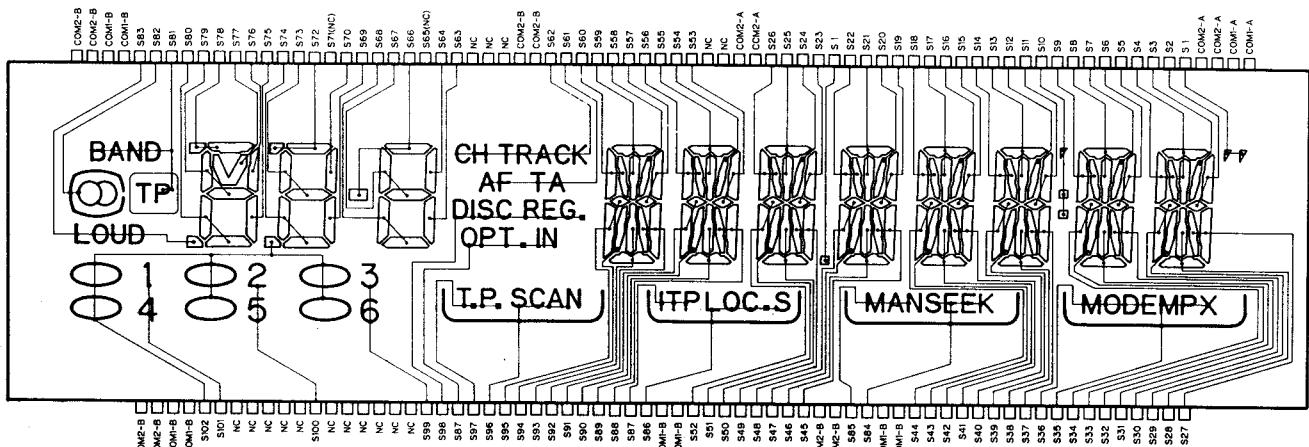
Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	NC			
2	AVREF	Input		A/D conversion reference voltage input (connected to DIR 5V).
3	VDD			VDD
4	VPP			PROM write power. Connected to VDD.
5	BLGT	Output	C	Back light power control output.
6	MUTE	Output	C	System mute output.
7	SYSPOW	Output	C	System power control output.
8	TLM	Output	C	Illumination control output.
9	VST	Output	C	Electronic volume strobe output.
10	VDT	Output	C	Electronic volume data output.
11	VCK	Output	C	Electronic volume clock output.
12	DLOK	Output	C	Detach unlock solenoid output.
13	SWVDD	Output	C	Key microcomputer power control output.
14	LCE2	Output	C	LCD driver chip enable 2 output.
15	LCE1	Output	C	LCD driver chip enable 1 output.
16	LINH	Output	C	LCD driver inhibit output.
17	DSENS	Input		Detach/attach sensor input.
18	LDT	Output	C	LCD driver control data output.
19	LCK	Output	C	LCD driver clock output.
20	PEE	Output	C	Key touch tone pulse output.
21	AB7			
		Output	C	RAM address output.
28	AB0			
29	DB7	Input/Output		
			NM	RAM data input/output.
32	DB4			
33	GND			GND
34	DB3	Input/Output		
			NM	RAM data input/output.
37	DB0			
38	AB10			
		Output	C	RAM address output.
40	AB8			
41	BRXEN	Input/Output		Reception enable input/output.
42	MRD	Output	C	Read strobe output.
43	MWR	Output	C	Write strobe output.
44	CE	Output	C	RAM chip enable output.
45	BRST	Output	C	Terminal reset output.
46	BSRQ	Input		Polling request input.
47	BSENS	Input		Backup power sensor input.
48	ASENS	Input		Accessory power sensor input.
49	REMIN	Input		Remote control signal input.
50	BSI	Input		Serial data input.
51	BSO	Output	C	Serial data output.
52	BSCK	Input/Output	C	Serial data clock input/output.

Pin No.	Pin Name	I/O	Output Format	Function and Operation
53	CSENS/TENBL	Input		D/D converter voltage sensor input.
54	GND			
55	XT1			
56	XT2			
57	IC (GND)			GND
58	X1			Crystal connection terminal.
59	X2			Crystal connection terminal.
60	RESET	Input		CPU hard reset input.
61	DISB	Input		AUX operation stop signal input.
62				
63	AUXR1	Input		AUX remote control 1 input.
64	AUXR0	Input		AUX remote control 0 input.
65	BMUTE	Output	NM	Bus signal mute output.
66	AMUTE	Output	NM	Source main mute output.
67	DFMUTE	Output	NM	Digital filter mute output.
68	S2	Output	NM	DIR input selection 2 output.
69	S1	Output	NM	DIR input selection 1 output.
70	CNTR	Output	NM	DIR counter output.
71	OPTB	Output	NM	DIR power control output.
72	NC			
73	AGND			A/D conversion ground (connected to GND)
74	M/S	Input		MAIN/SUB selection input.
75	SIMK0	Input		Destination identification input 0.
76	SIMK1	Input		Destination identification input 1.
77	TEST	Input		Test program start input.
78	ERR1	Input		DIR error 1 input.
79	ERR2	Input		DIR error 2 input.
80	EMPHIN	Input		DIR emphasis input.

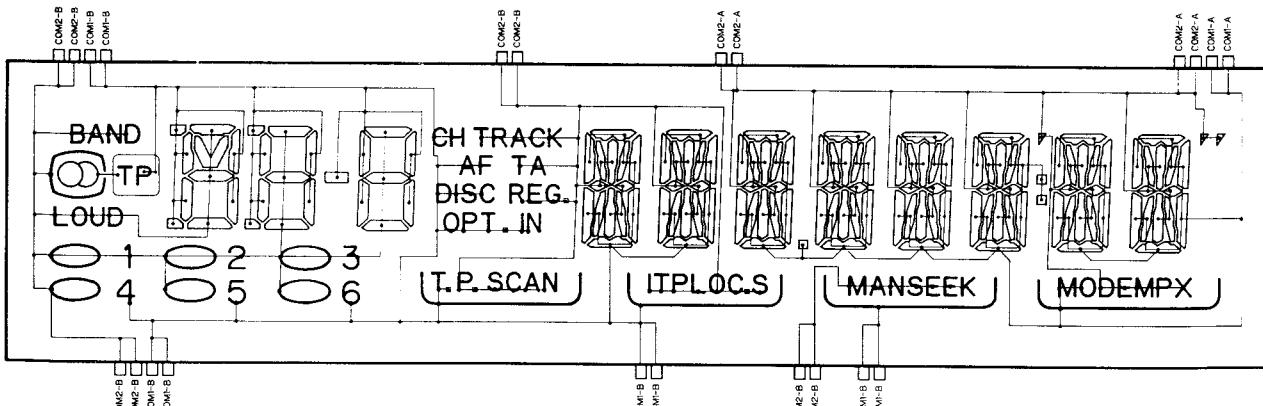
Output Format	Meaning
C	C-MOS
NM	Neutral resistivity N channel open drain

- LCD (CAW1096)

## SEGMENT



## COMMON

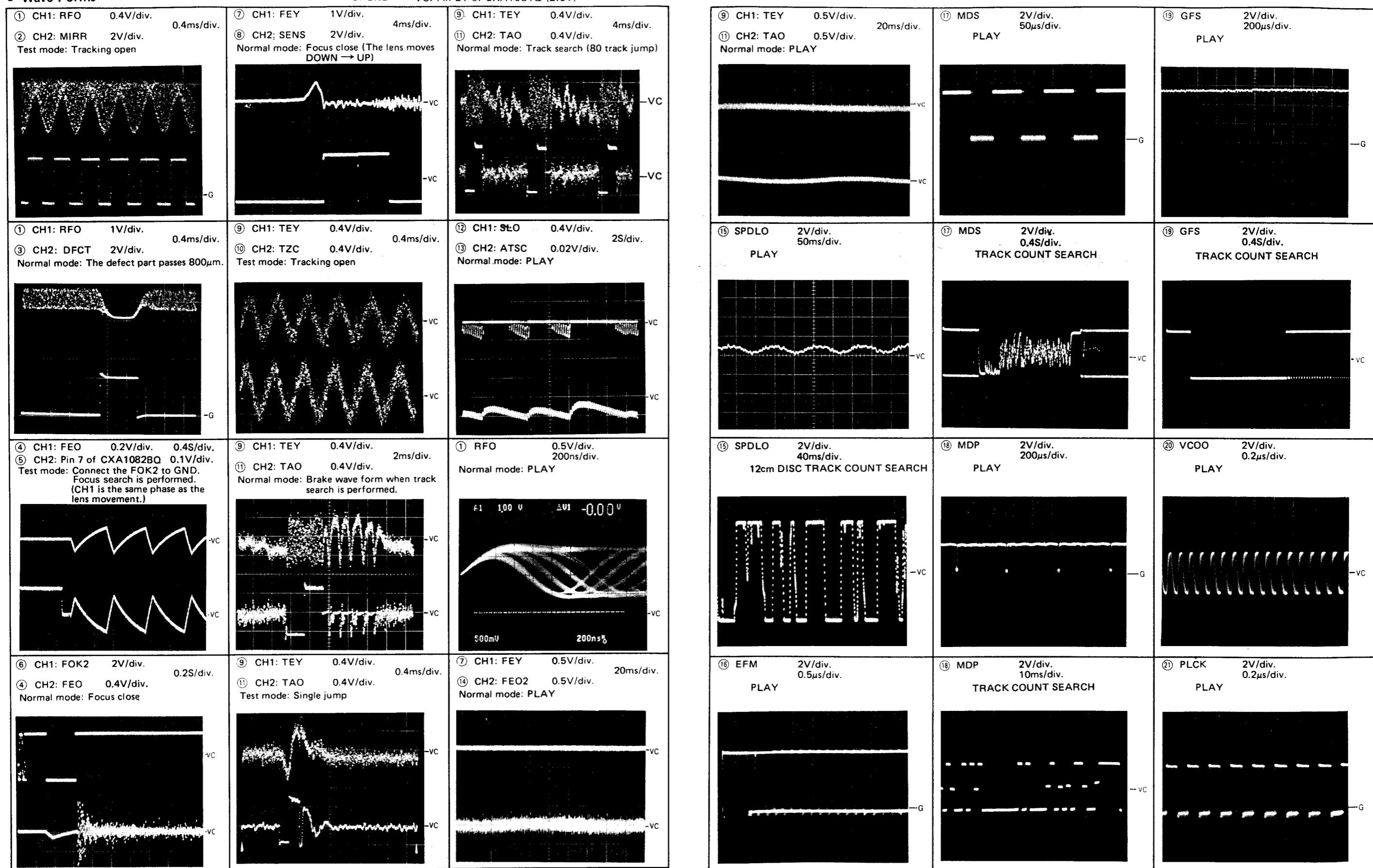


Note: 1. The encircled numbers denote measuring points in the circuit diagram.

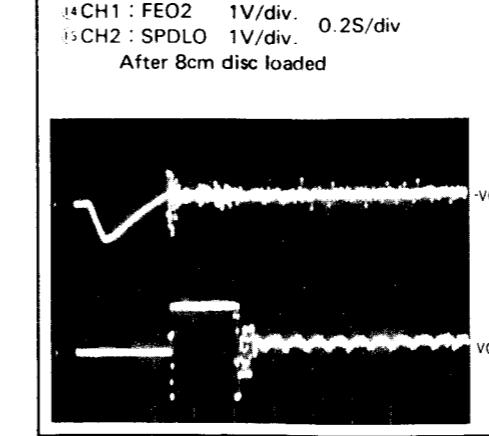
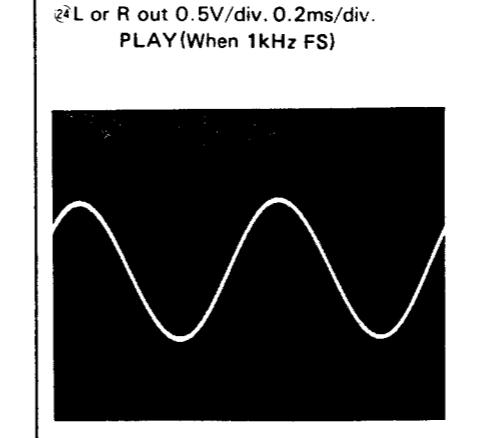
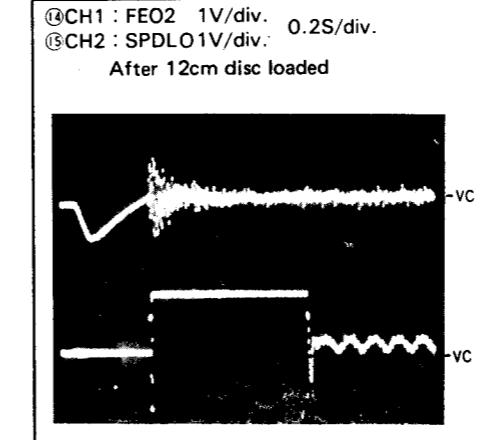
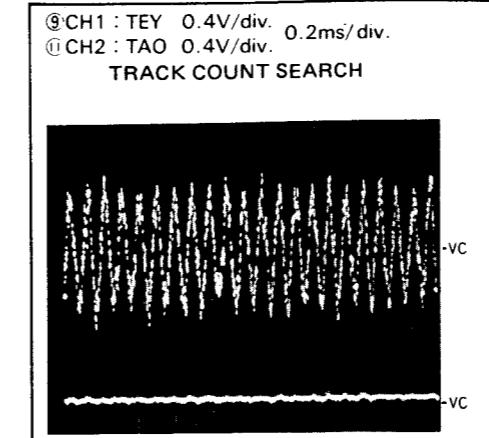
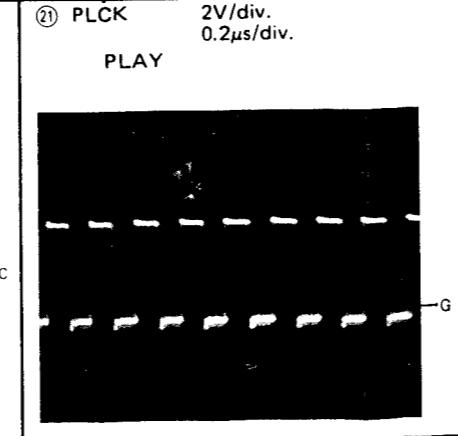
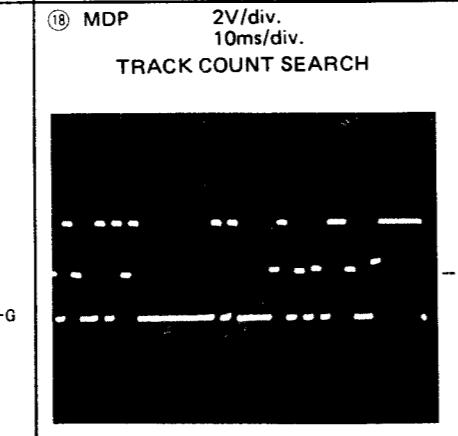
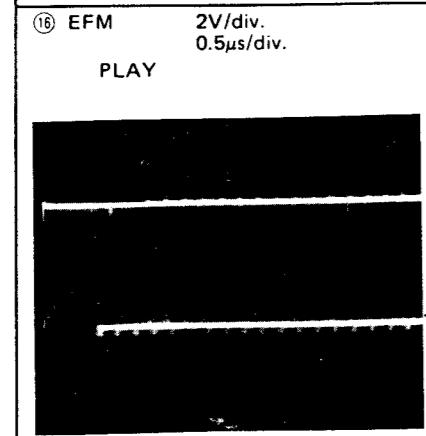
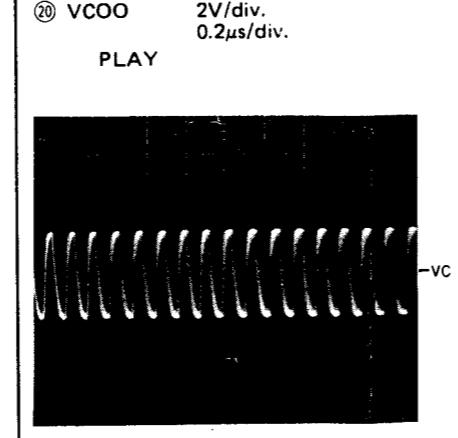
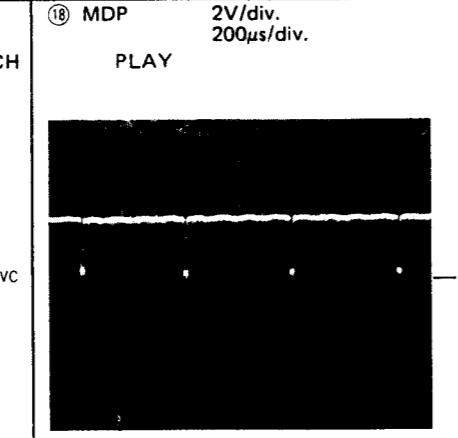
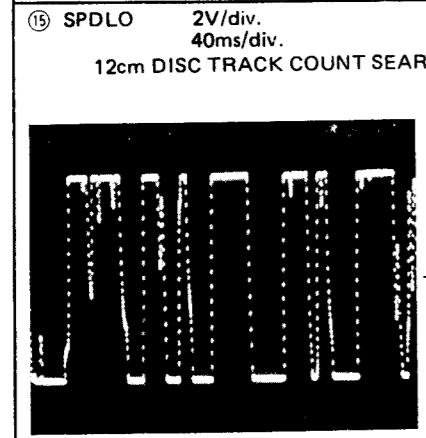
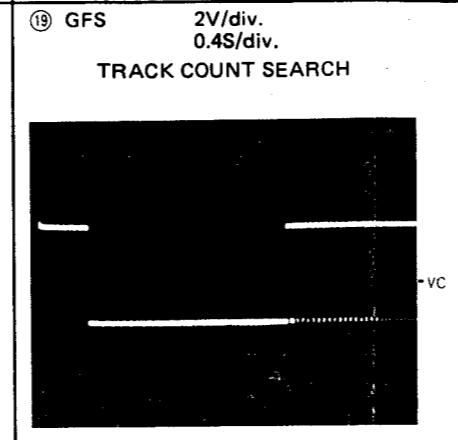
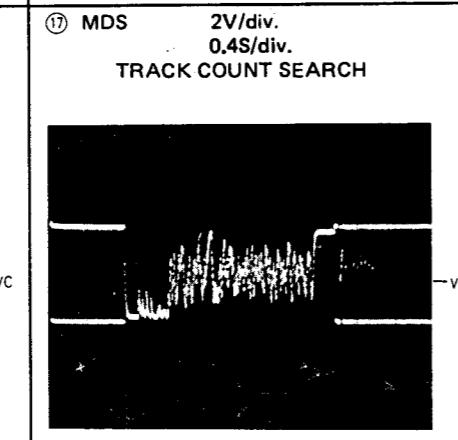
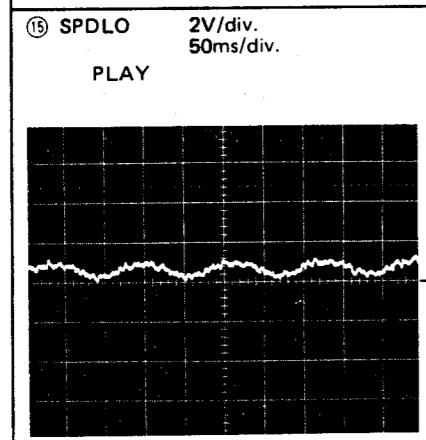
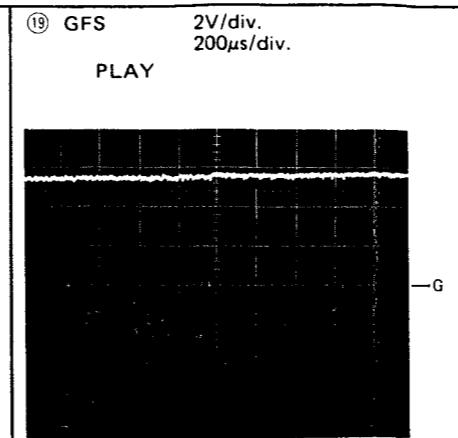
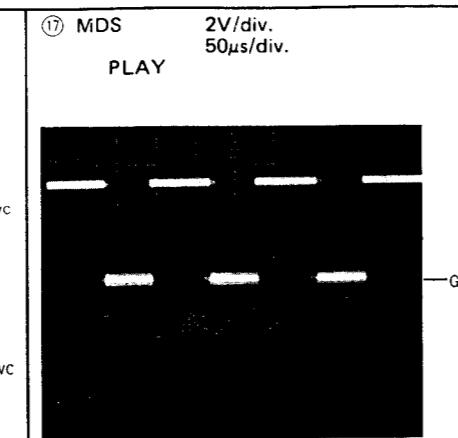
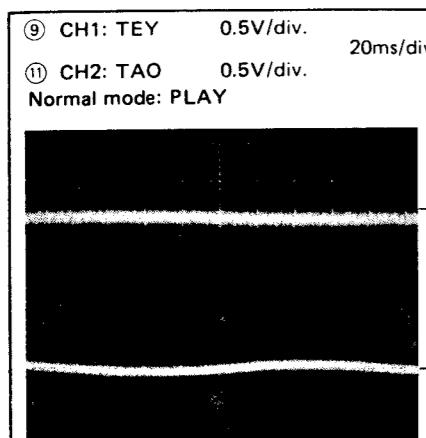
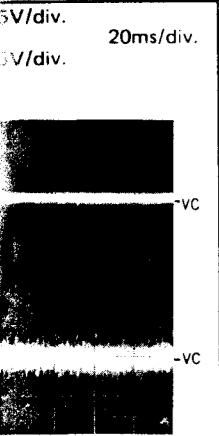
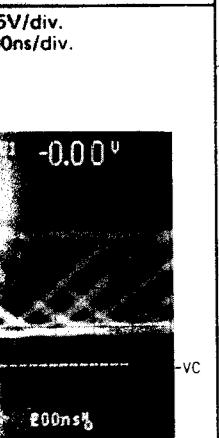
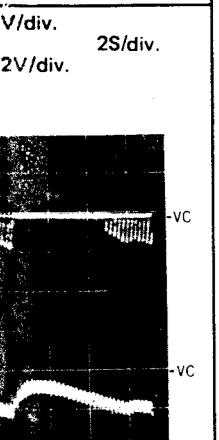
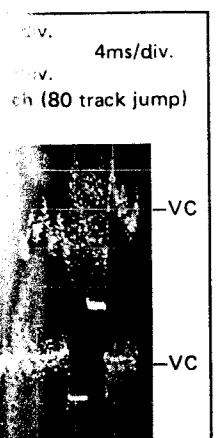
2. Reference voltage

G: GND VC: Pin 21 of CXA1081Q (2.5V)

• Wave Forms

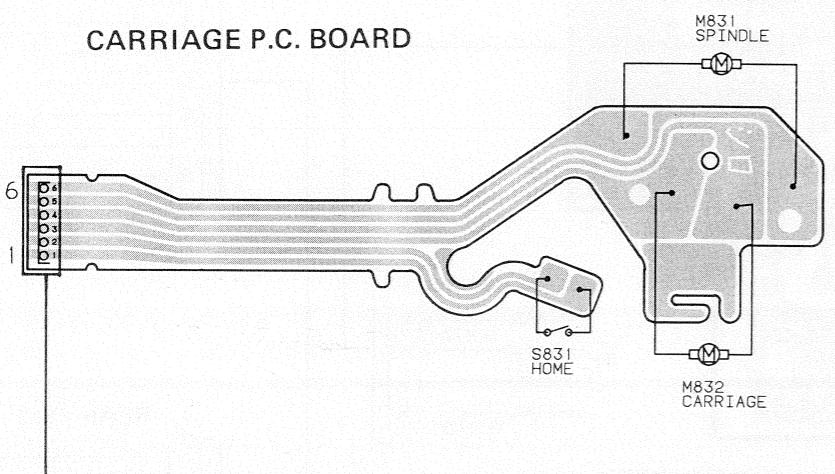


the circuit diagram.

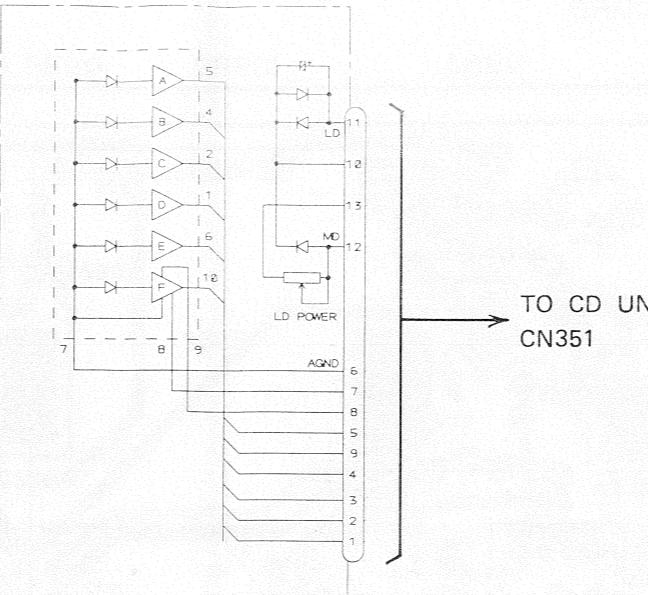


## 9. CONNECTION DIAGRAM(1)

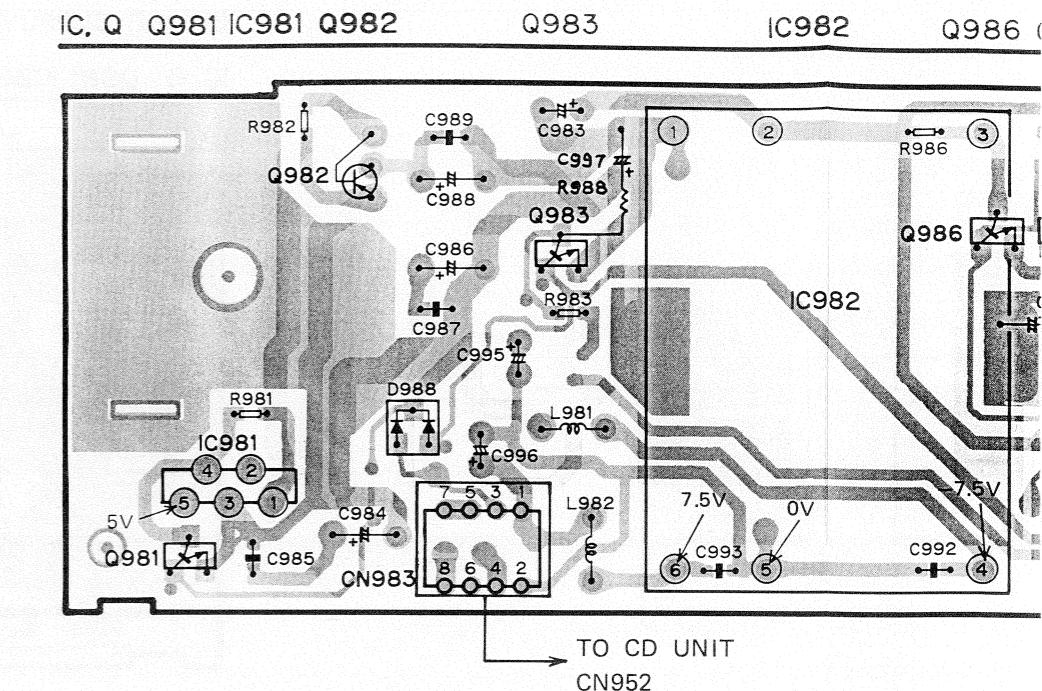
CARRIAGE P.C. BOARD



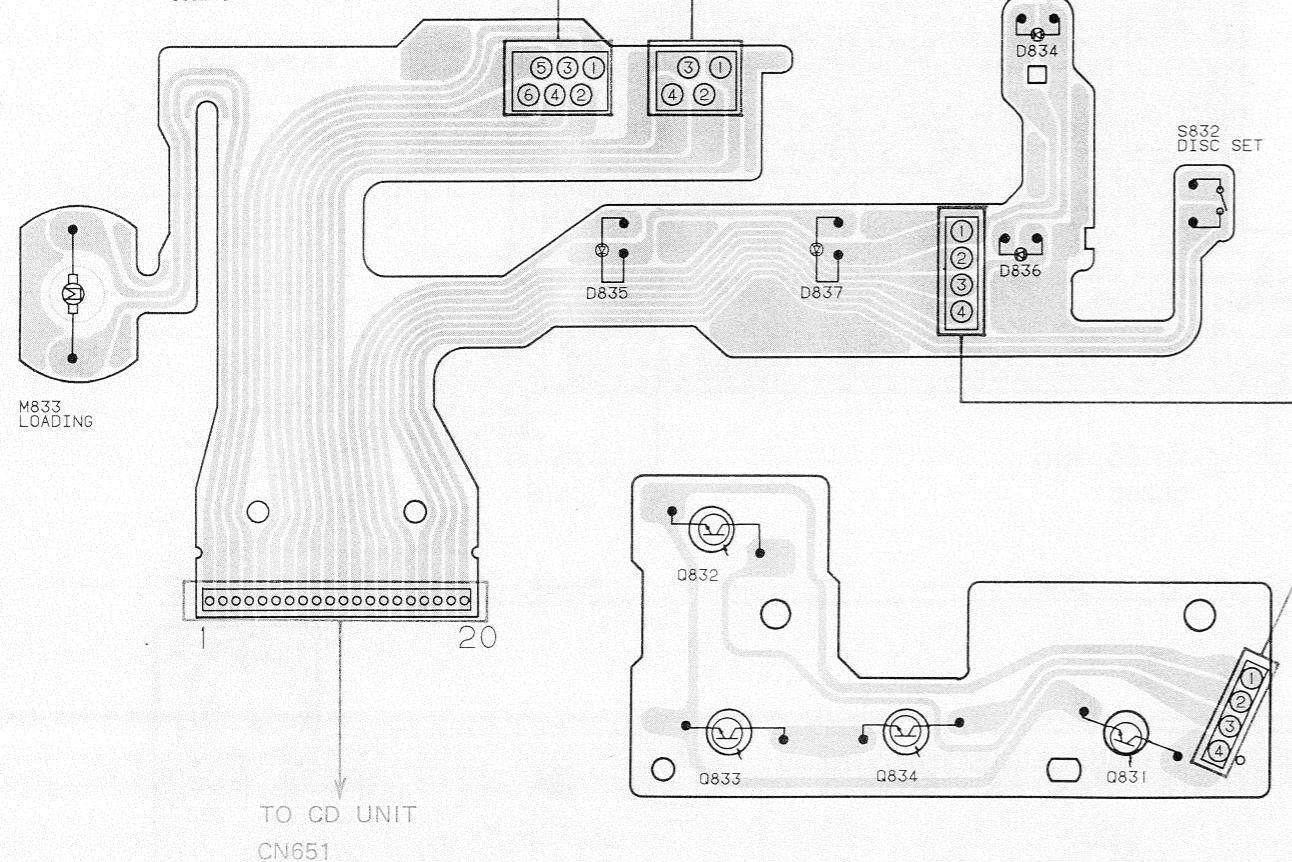
PU UNIT (CGY1015) (1/2)



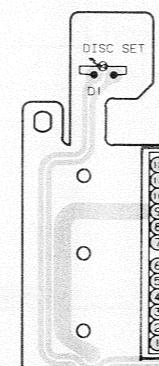
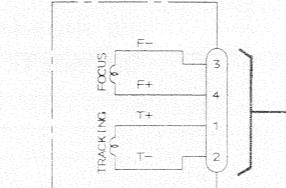
POWER SUPPLY P.C. BOARD



MECHANISM P.C. BOARD



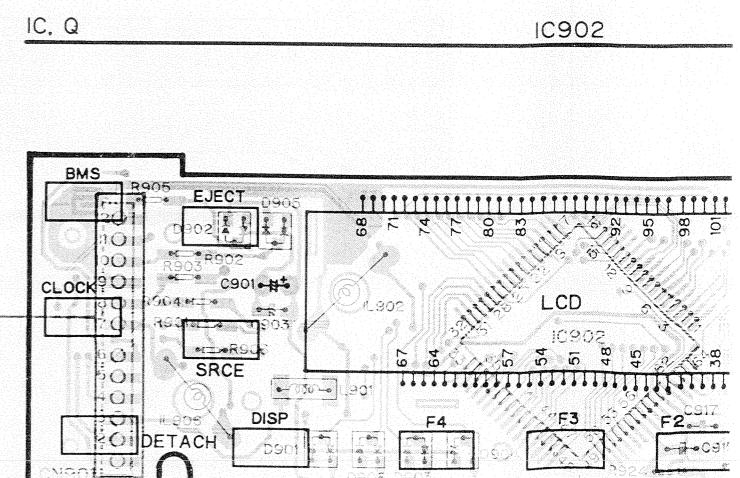
PU UNIT (CGY1015) (2/2)



P.C. BOARD

TO CD UNIT  
CN752

DISPLAY UNIT



4

5

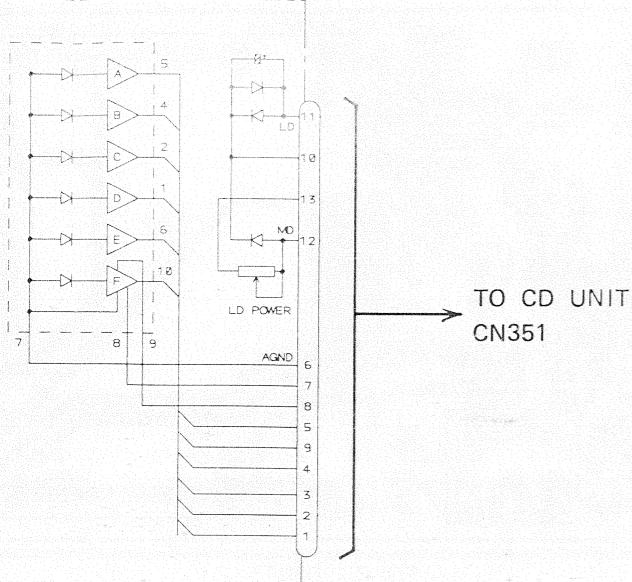
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7

8

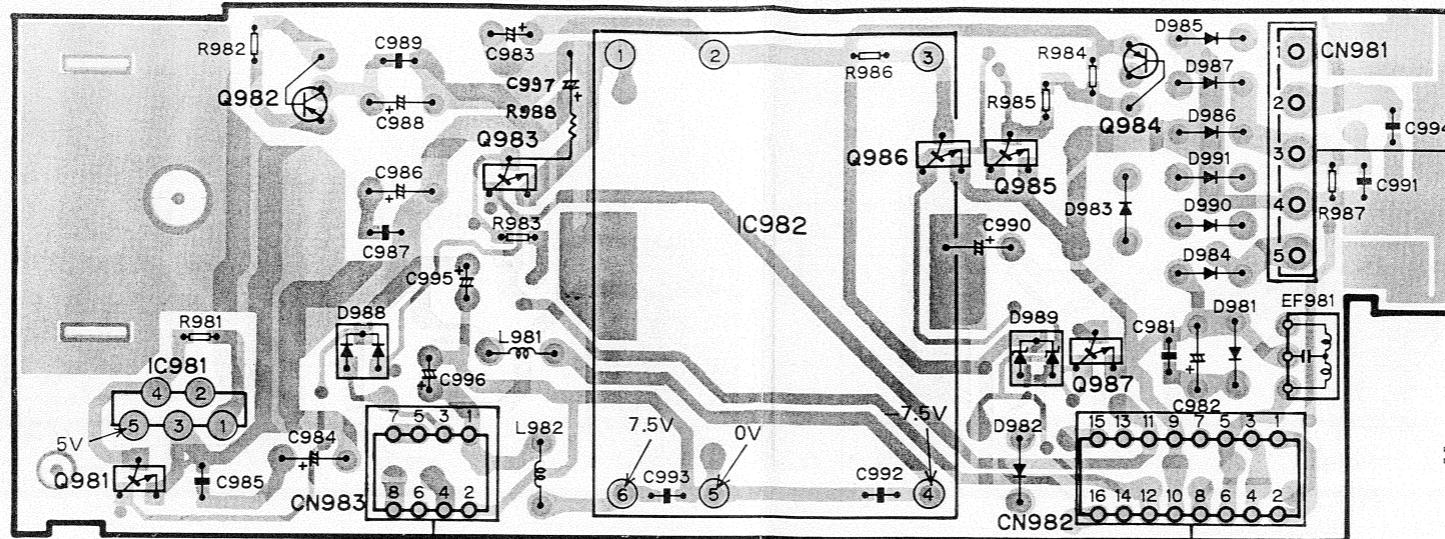
9

## PU UNIT (CGY1015) (1/2)

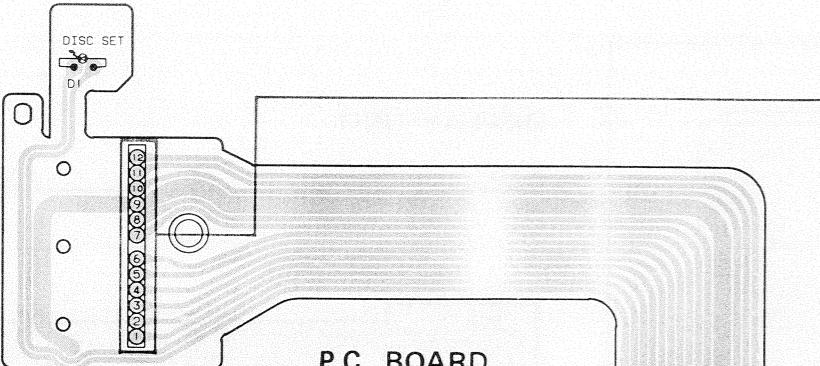
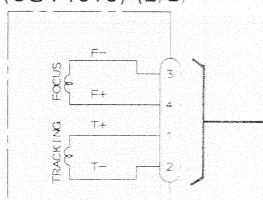


## POWER SUPPLY P.C. BOARD

IC, Q Q981 IC981 Q982 Q983 IC982 Q986 Q985 Q987



## PU UNIT (CGY1015) (2/2)



## DISPLAY UNIT

IC, Q IC902 IC901 IC904 IC903 IC905 Q902 Q901

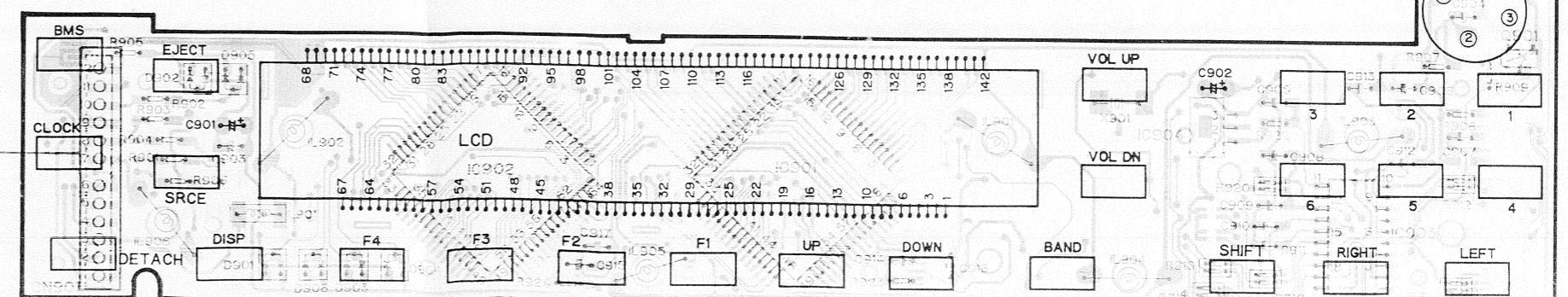
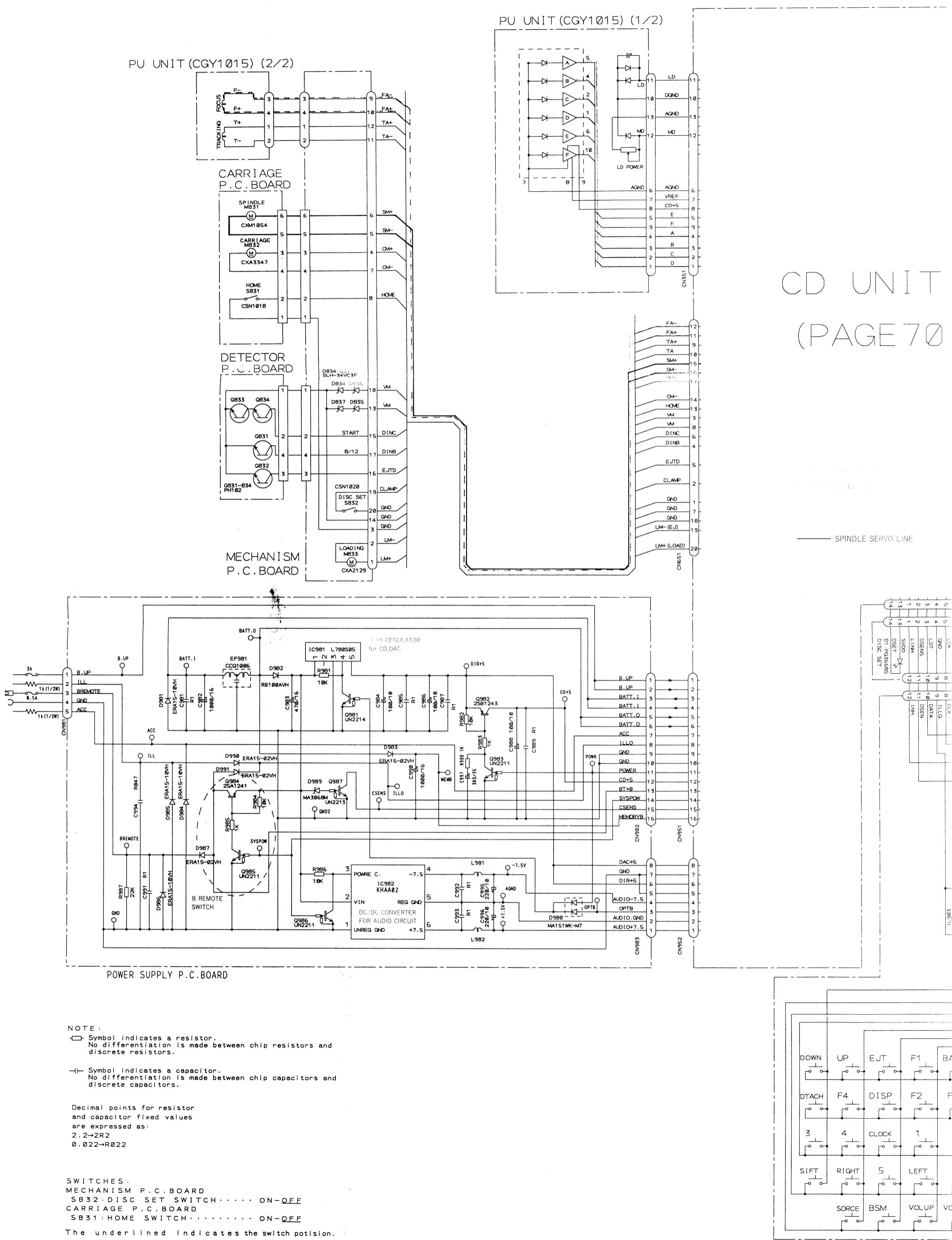
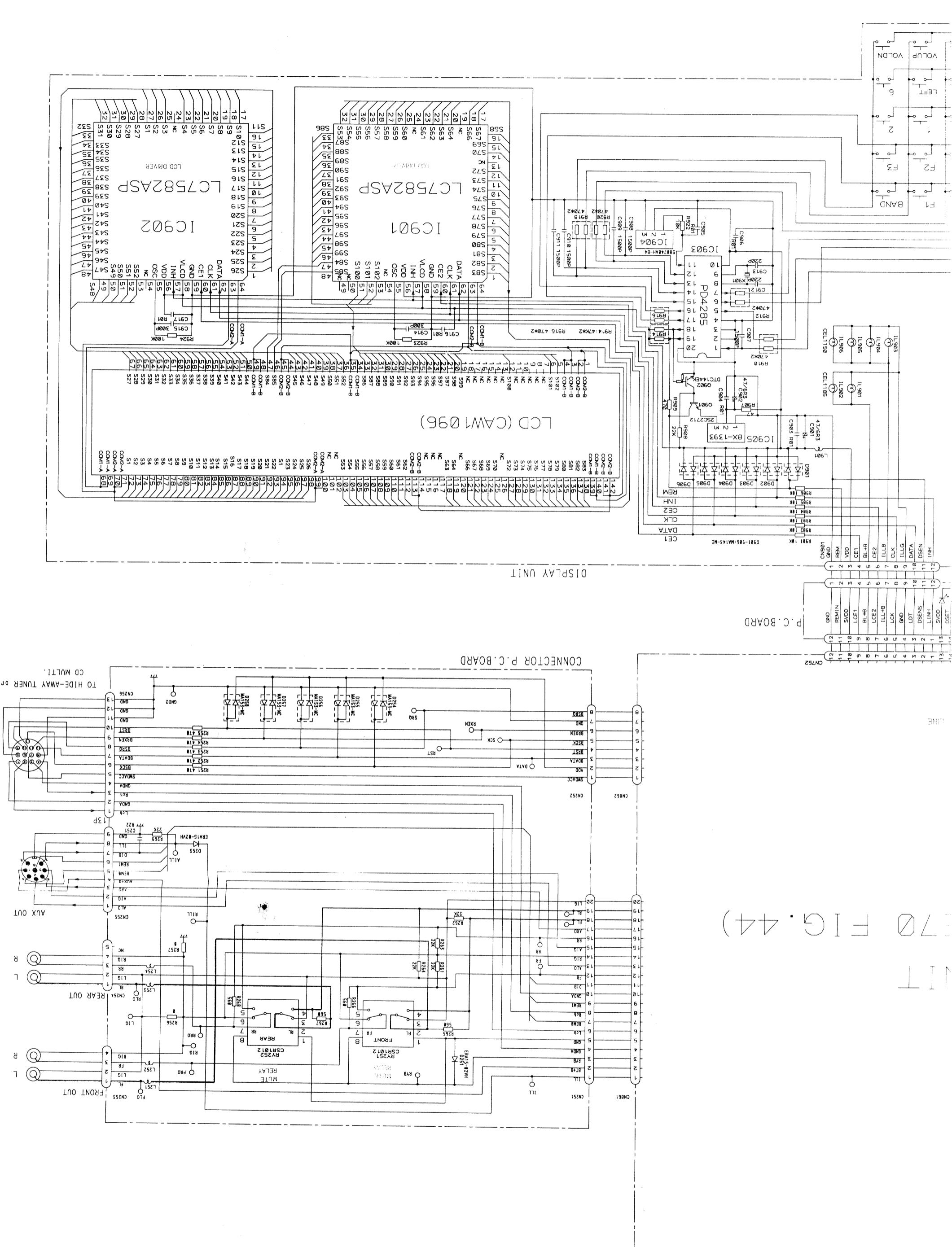


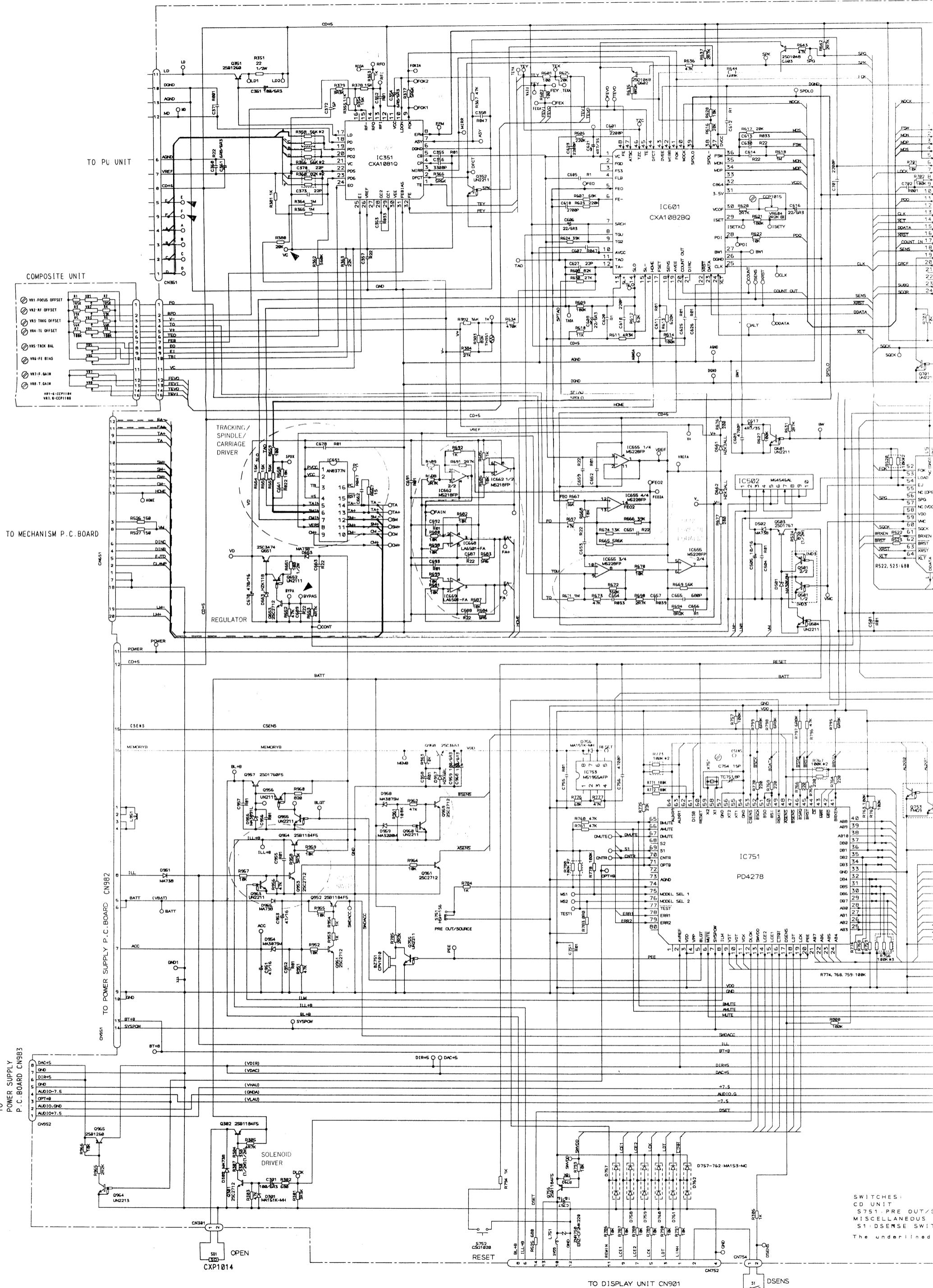
Fig. 42

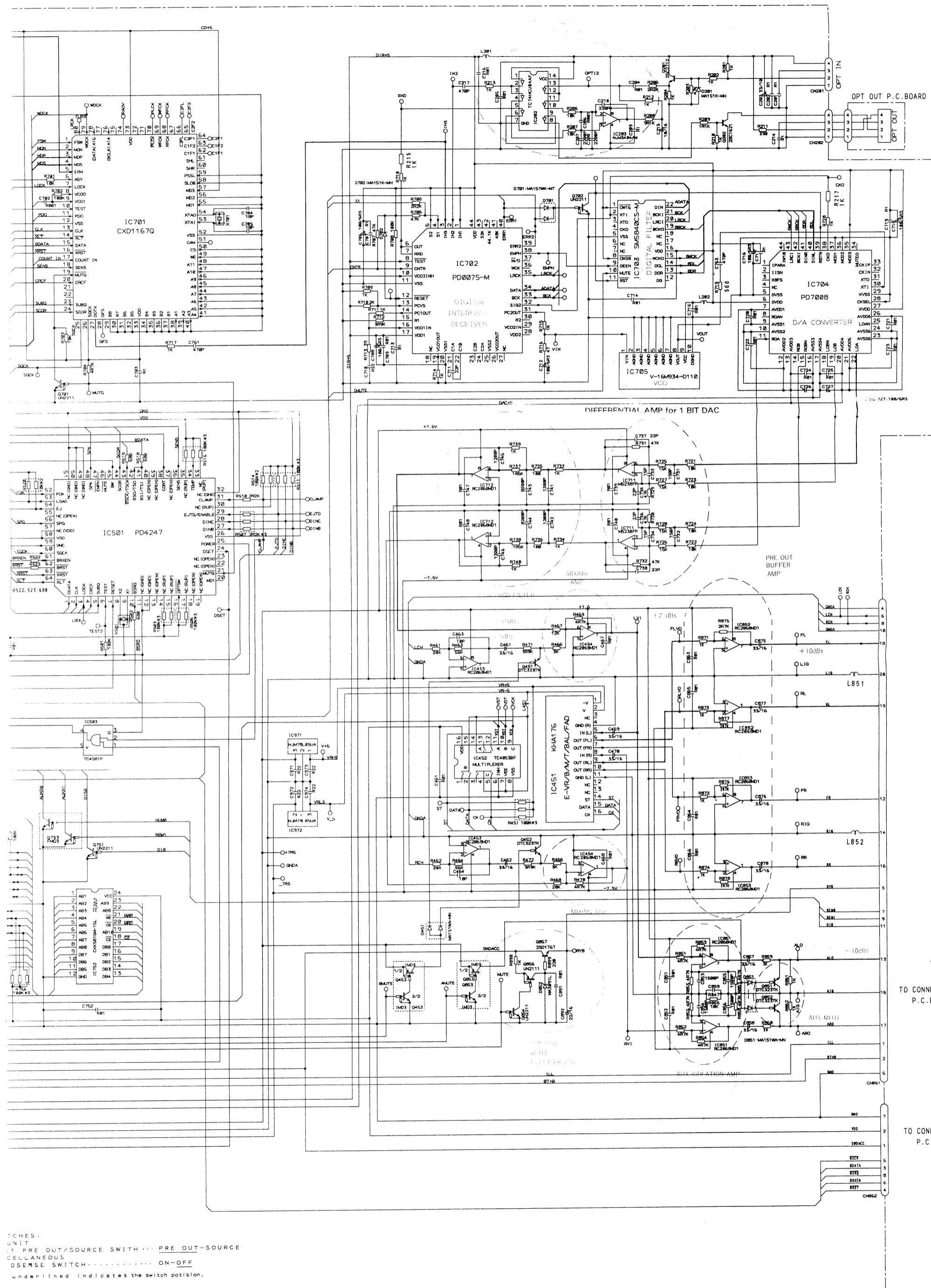
## 10. SCHEMATIC CIRCUIT DIAGRAM(1)





## **11. SCHEMATIC CIRCUIT DIAGRAM(2)**





TCHESS  
UNIT  
.1 PRE OUT/SOURCE SWITH ... PRE OUT-SOURCE  
CELLANEOUS  
DSENSE SWITCH ..... ON-OFF  
underlined indicates the switch position.

## 12. CONNECTION DIAGRAM(2)

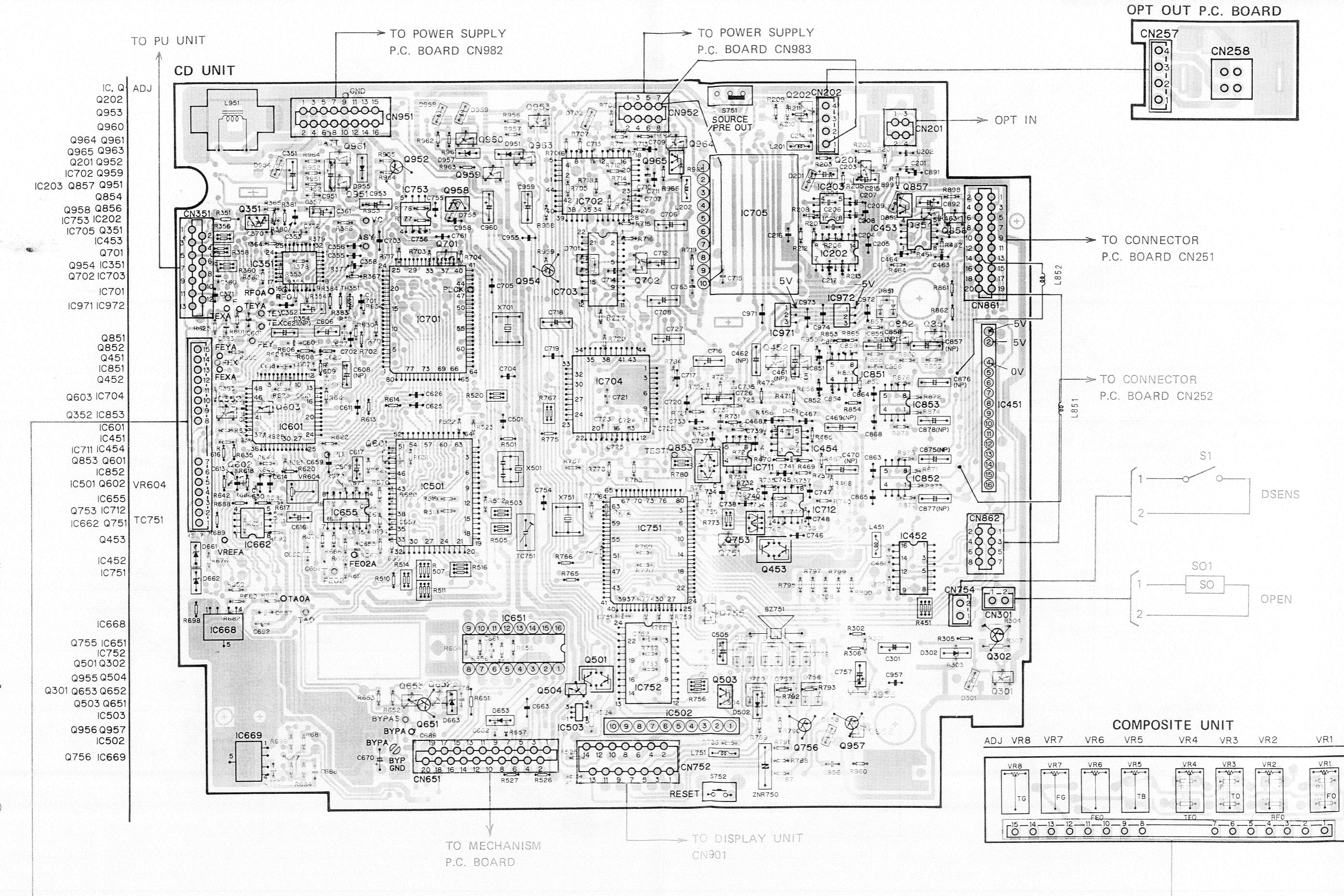
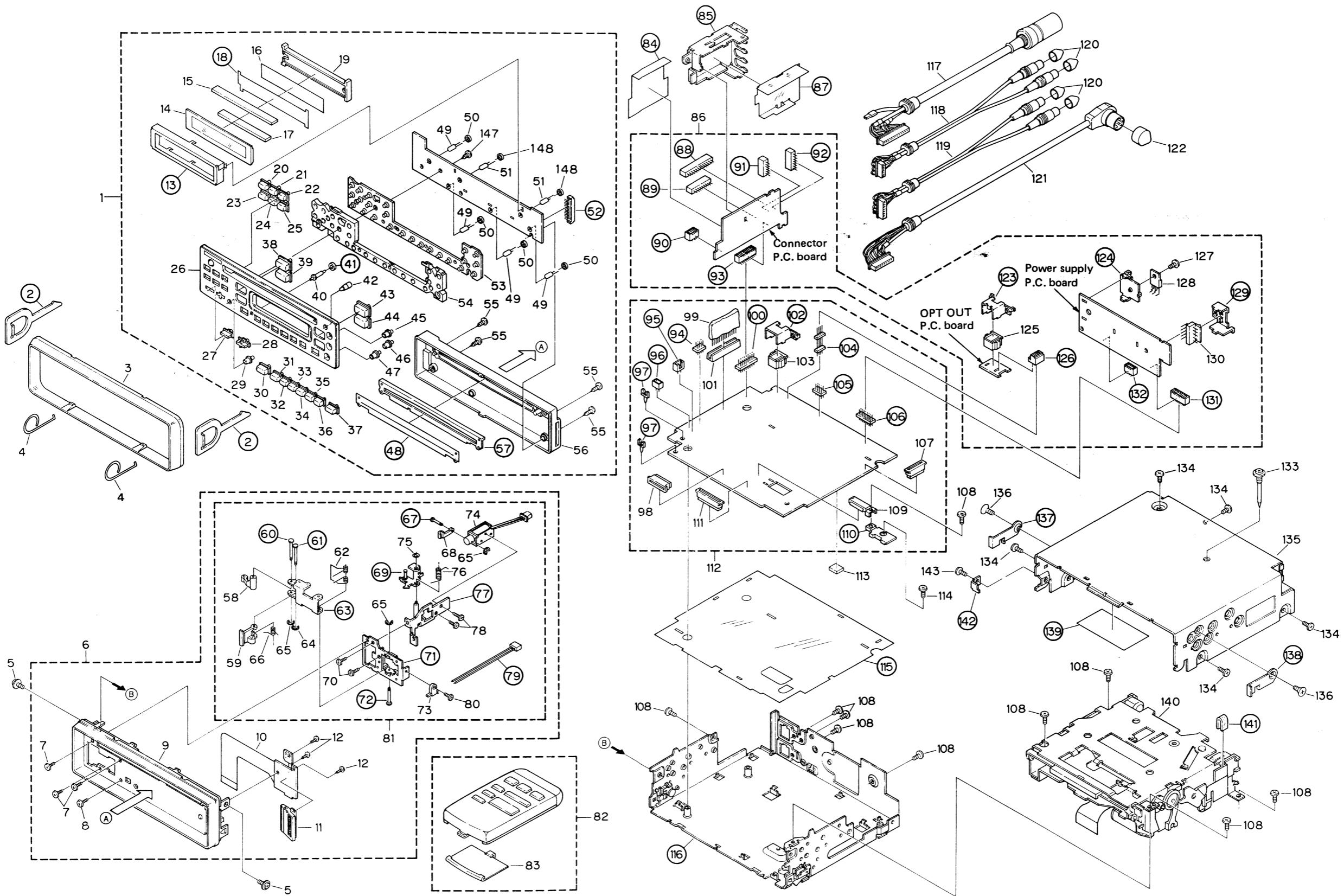


Fig. 45

## 13. CHASSIS EXPLODED VIEW



## ● Parts List

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by “◎” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Mark No.	Description	Part No.	Mark No.	Description	Part No.
◎ 1	Display Assy (US)	CXA3692	44	Button (SRCE)	CAC2561
	Display Assy (ES)	CXA3694	45	Button (B)	CAC2603
2	Holder		46	Button (CLOCK)	CAC2604
3	Panel	CNS2165	47	Button (DETACH)	CAC2562
4	Spring	CBH-865	48	Holder	
5	Screw	PMS30P040FMC	49	Lamp	CEL1150
◎ 6	Detach Grille Assy	CXA3699	50	Bush	CNV-724
7	Screw	BPZ20P040FZK	51	Lamp	CEL1185
8	Screw	PMZ20P020FZK	52	Plug	
9	Grille Unit	CXA3559	53	Rubber	CNV2527
10	P.C. Board	CNP2434	54	Lens	CNV2526
11	Socket	CKS1664	55	Screw	BMZ20P050FZK
12	Screw	BPZ20P050FMC	56	Cover	CNS1982
13	Holder		57	Cover	
14	LCD	CAW1096	58	Arm	CNV2483
15	Connector	CNV2524	59	Holder	CNV2306
16	Lens	CNV2525	60	Shaft	
17	Connector	CNV2600	61	Shaft	
18	Plate		62	Spring	CBH1315
19	Holder	CNV2604	63	Holder Unit	
20	Button (1)	CAC2551	64	Washer	YE12FUC
21	Button (2)	CAC2552	65	Washer	YE15FUC
22	Button (3)	CAC2553	66	Spring	CBH1364
23	Button (4)	CAC2554	67	Shaft	
24	Button (5)	CAC2555	68	Arm	CNV2528
25	Button (6)	CAC2556	69	Arm Unit	
26	Grille Unit (US)	CXA3558	70	Screw	BMZ20P040FMC
	Grille Unit (ES)	CXA3701	71	Holder Unit	
27	Button (-)	CAC2607	72	Shaft	
28	Button (+)	CAC2608	73	Switch	CSN1012
29	Button (SHIFT)	CAC2557	74	Solenoid	CXP1014
30	Button (BAND)	CAC2549	75	Washer	WT22D050D025
31	Button (-)	CAC2609	76	Spring	CBH1328
32	Button (+)	CAC2610	77	Holder Unit	
33	Button (F1)	CAC2611	78	Screw	BMZ20P025FMC
34	Button (F2)	CAC2612	79	Connector	
35	Button (F3)	CAC2613	80	Screw	BMZ20P060FMC
36	Button (F4)	CAC2614	◎ 81	Detach Unit	CXA3700
37	Button (DISP)	CAC2550	82	Remote Control Assy	CXA3708
38	Button (+)	CAC2558		(US)	
39	Button (-)	CAC2559		Remote Control Assy	CXA3573
40	Button	CAC2563		(ES)	
41	Cushion		83	Battery Cover	CNS1962
42	Lens	CNS1984	84	Insulator	
43	Button (EJECT)	CAC2560	85	Cover	

Mark No.	Description	Part No.	Mark No.	Description	Part No.
◎ 86	Power Supply Unit	CWR1027	116	Chassis Unit	
			117	Cord	CDE2896
			118	Cord	CDE3212
			119	Cord	CDE3213
			120	Cap	CNV2680
			91	Plug (4P)	CDE3062
			92	Plug (5P)	CNV1455
			93	Connector	
			94	Plug	
			95	Plug	
			96	Plug	
			97	Holder	
			98	Connector	CKS1534
			99	IC	KHA176
			100	Plug	
			101	Holder	CNV2669
			102	Holder	
			103	Connector	CKS1842
			104	Plug	
			105	Plug	
			106	Plug	
			107	Connector	CKS1565
			108	Screw	BMZ26P040FMC
			109	IC	AN8377N
			110	Plate	
			◎ 111	Connector	CKS1572
			112	CD Unit	CWX1321
			113	Spacer	CNM2954
			114	Screw	PMS26P050FMC
			115	Insulator	
			141	Cushion	
			142	Holder	
			143	Screw	PMS20P040FZK
			144	Cord	CDE2901
			145	Cap	CNS1472
			146	Resistor	RS1/2PS102JL
			147	Screw	BPZ20P060FMC
			148	Bush	CNW-766

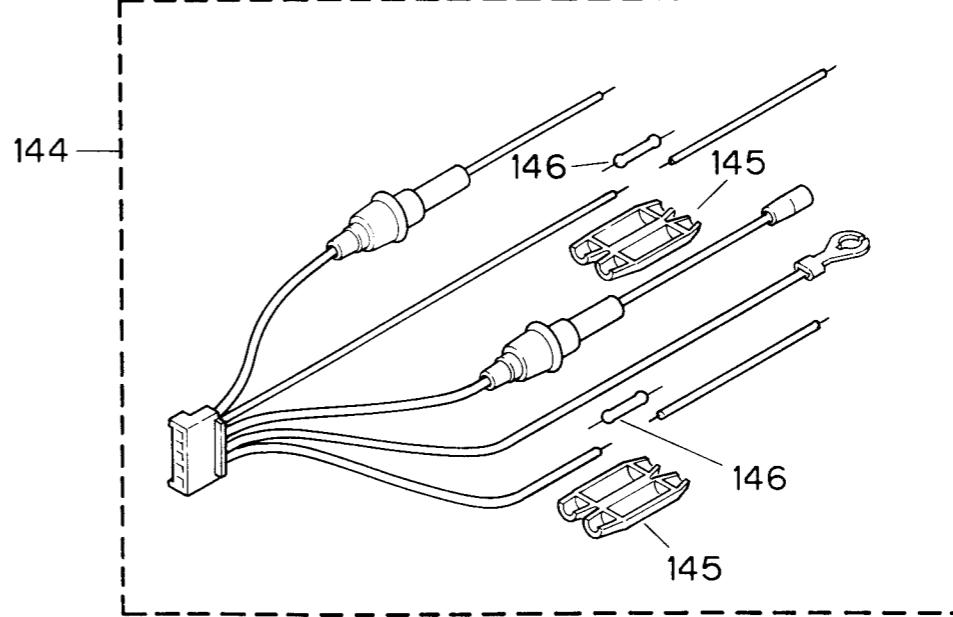
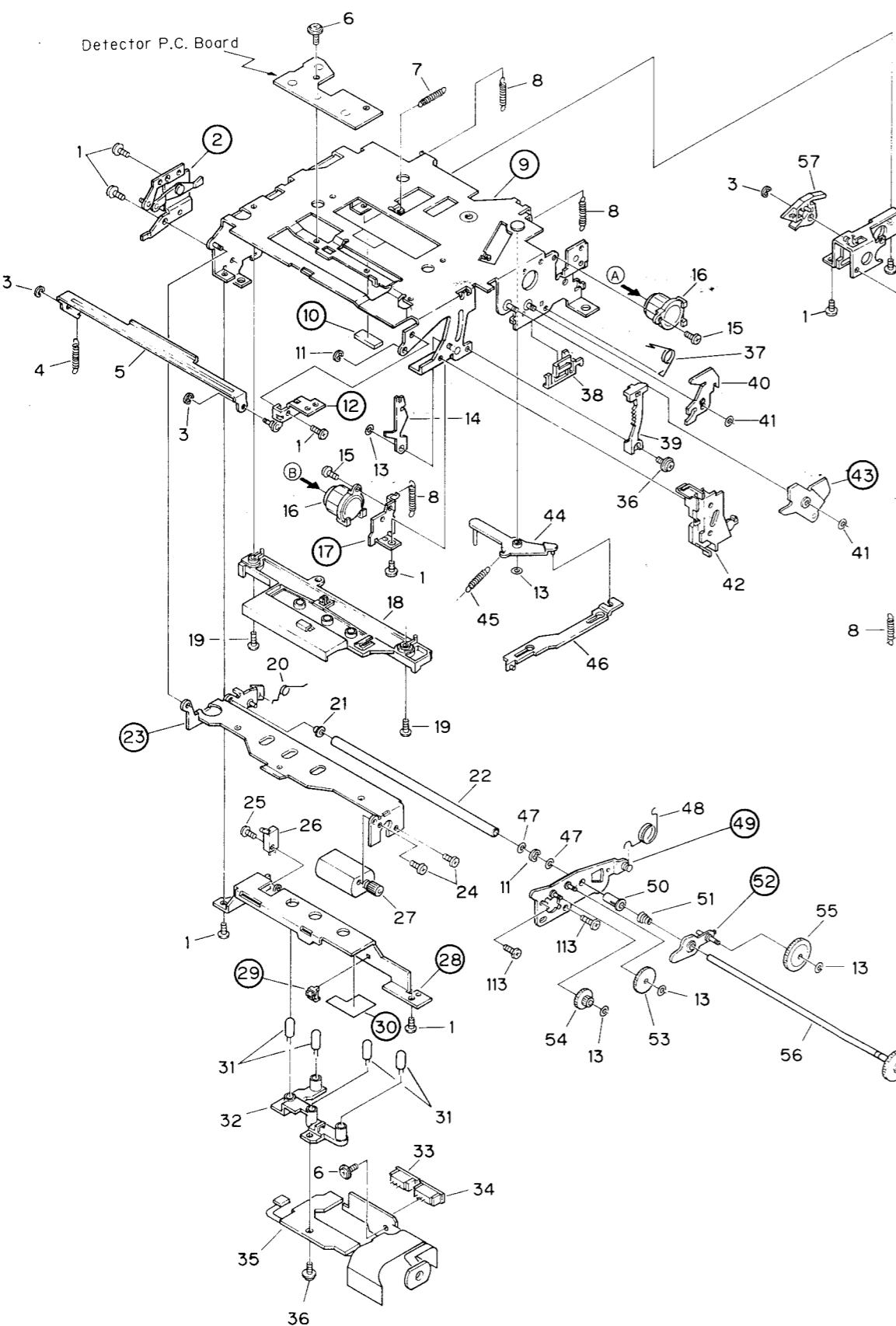


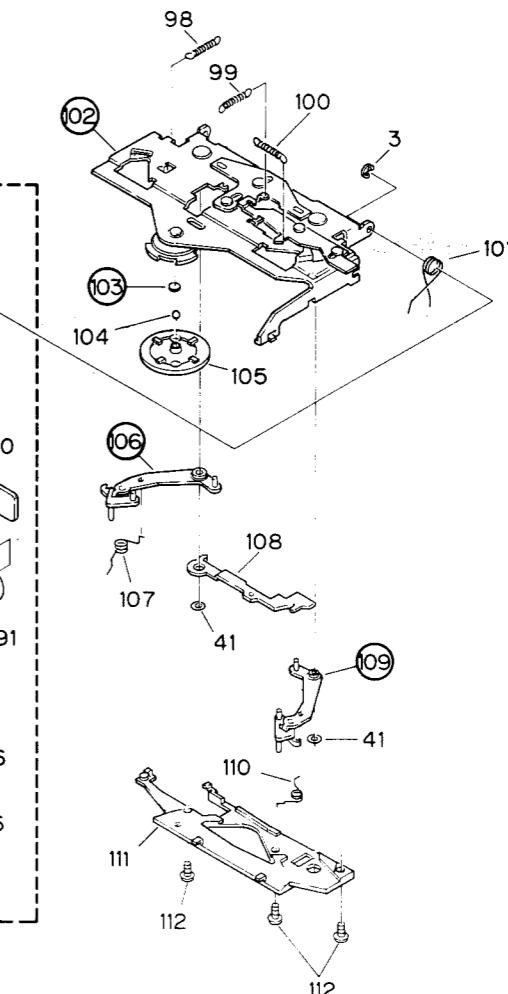
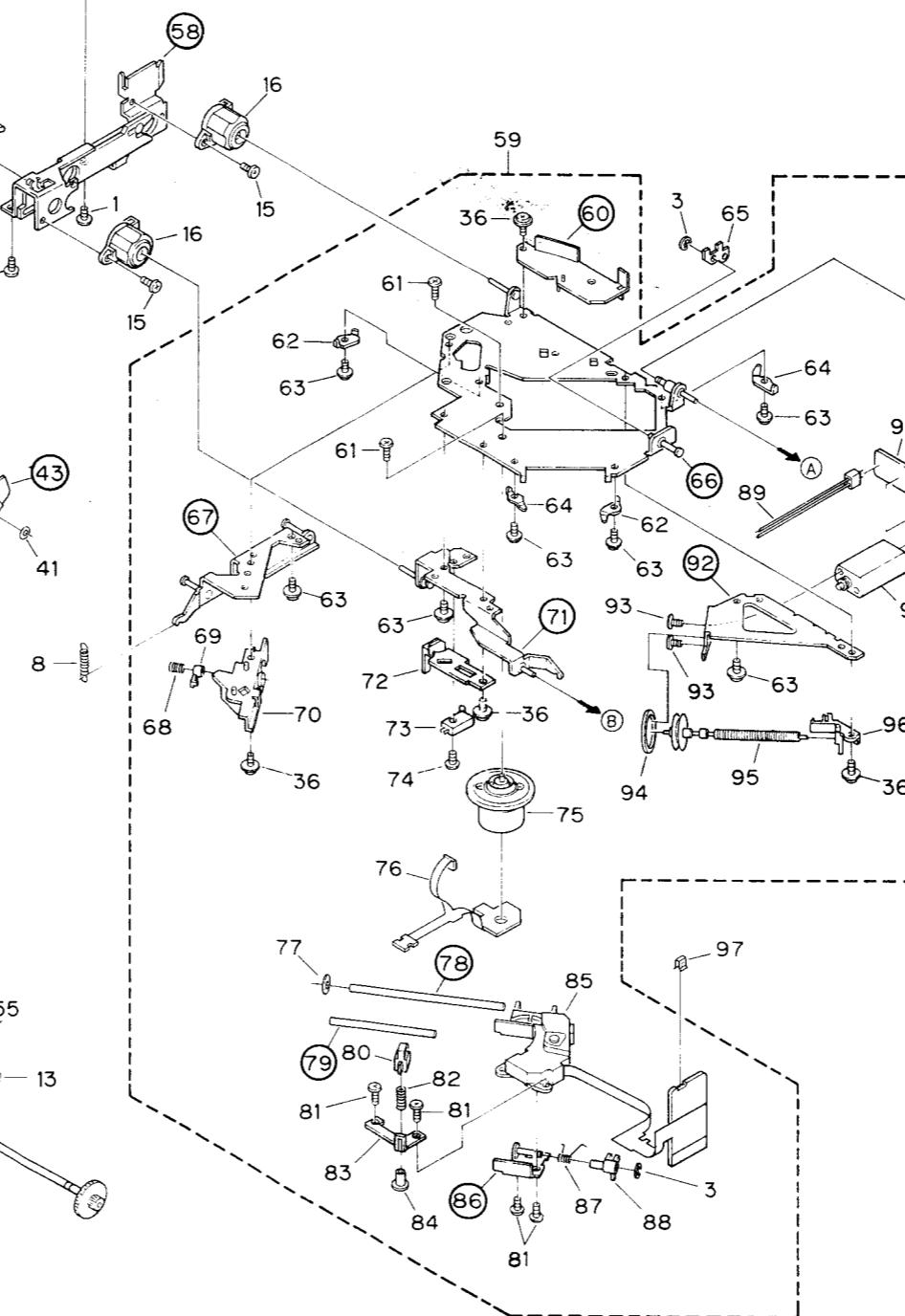
Fig. 46-2

## 14. CD MECHANISM UNIT EXPLODED VIEW

A



B



A

B

C

D

Fig. 47

## ● Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ26P030FMC	41	Washer	CBF1022
2	Bracket Unit		42	Cover	CNV2452
3	Washer	YE15FUC	43	Arm Unit	
4	Spring	CBH1137	44	Arm	CNV2506
5	Arm	CNC2858	45	Spring	CBH1343
6	Screw	CBA1076	46	Lever	CNV2505
7	Spring	CBH1136	47	Washer	HBF-126
8	Spring	CBH1182	48	Spring	CBH1133
9	Chassis Unit		49	Bracket Unit	
10	Cushion		50	Bearing	CNV2224
11	Washer	YE20FUC	51	Spring	CBH1181
12	Bracket Unit		52	Arm Unit	
13	Washer	CBF-166	53	Gear	CNV1628
14	Cam	CNV2535	54	Gear	CNV1627
15	Screw	CBA1118	55	Gear	CNV1629
16	Damper Unit	CXA3339	56	Gear Unit	CXA2990
17	Bracket		57	Arm	CNV2510
18	Guide	CNV2221	58	Bracket Unit	
19	Screw	CBA1131	◎ 59	Carriage Mechanism Unit	CXA3474
20	Spring	CBH1299			
21	Bearing	CNV1884	60	Guide	
22	Roller	CNV2225	61	Screw	HBA-163
23	Arm Unit		62	Holder	CNC1738
24	Screw	HBA-175	63	Screw	PMS20P030FMC
25	Screw	CBA1070	64	Holder	CNC1739
26	Switch	CSN1020	65	Arm Unit	CXA3441
27	Motor Unit	CXA2129	66	Chassis Unit	
28	Bracket		67	Bracket Unit	
29	Holder		68	Spring	CBH1104
30	Insulator		69	Spacer	CNV1844
31	LED	SLH-34VC3F	70	Holder	CNV2485
32	Holder	CNV2226	71	Holder Unit	
33	Connector	CKS-719	72	Holder	CNV2229
34	Connector	CKS-721	73	Switch	CSN1018
35	P. C. Board	CNP2178	74	Screw	CBA1070
36	Screw	CBA1075	75	Motor Unit	CXM1054
37	Spring	CBH1336	76	P. C. Board	CNP2383
38	Holder	CNV1633	77	Cushion	CNV1863
39	Gear	CNV2302	78	Shaft	
40	Arm	CNV2451	79	Shaft	

Mark No.	Description	Part No.	Mark No.	Description	Part No.
80	Holder	CNV1512	100	Spring	CBH1296
81	Screw	CBA1062	101	Spring	CBH1294
82	Spring	CBH1105	102	Arm Unit	
83	Holder	CNC1736	103	Spacer	
84	Screw	CLA1319	104	Ball	CNR1079
85	PU Unit	CGY1015	105	Clamper	CNV2411
86	Holder Unit		106	Arm Unit	
87	Spring	CBH1106	107	Spring	CBH1295
88	Luck	CNV1513	108	Arm	CNV2228
89	Connector	CDE2849	109	Arm Unit	
90	P. C. Board	CNP2384	110	Spring	CBH1293
91	Motor Unit	CXA3347	111	Guide	CNV2223
92	Bracket		112	Screw	CBA1084
93	Screw	CBA-098	113	Screw	BMZ20P030FMC
94	Belt	CNT1020			
95	Screw Unit	CXA2375			
96	Holder	CNV1781			
97	Short Pin	CBL1010			
98	Spring	CBH1292			
99	Spring	CBH1297			

## 15. PACKING METHOD

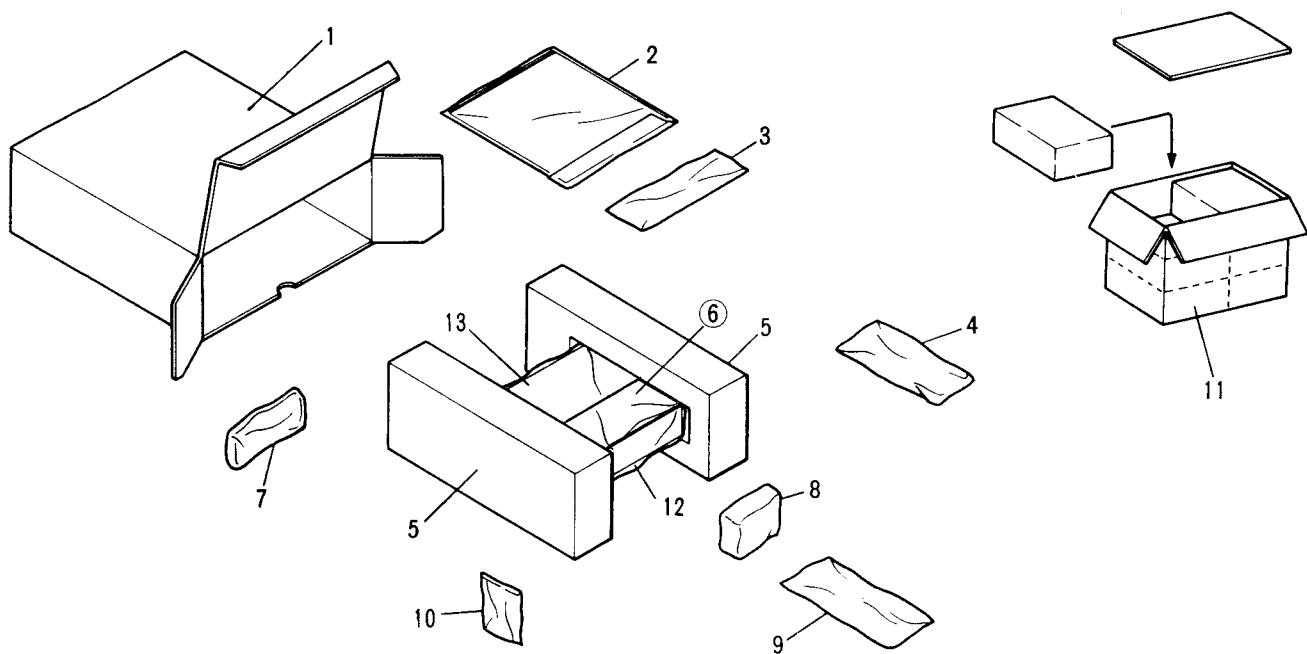


Fig. 48

### ● Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Carton (US)	CHG1848	4	Cord	CDE2901
	Carton (ES)	CHG1847	5	Styrofoam (× 2)	CHP1351
2-1	Seal		6	Holder	
2-2	Card (US)		7	Case	CNS2055
2-3	Owner's Manual (US) (English)	CRB1186	8	Remote Control Assy (US)	CXA3708
	Owner's Manual (ES) (English, French, Spanish, Arabic)	CRD1396		Remote Control Assy (ES)	CXA3573
3	Accessory Assy	CEA1581	9	Panel	CNS2165
3-1	Spring (× 2)	CBH-865	10-1	Battery	
3-2	Holder (× 2)		10-2	Fastener	CNM1716
3-3	Holder (× 1)		10-3	Fastener	CNM1717
3-4	Strap (× 1)	CNF-111	11	Contain Box (US)	CHL1848
3-5	Bush (× 1)	CNV1917	12	Cover	CEG1064
3-6	Screw (× 1)	PMS20P040FZK	13	Caution Card	CRP1080
3-7	Screw Assy				
3-8	Screw (× 4)	BMZ40P080FMC			
3-9	Screw (× 4)	BMZ50P080FMC			
3-10	Screw (× 1)	CBA-102			
3-11	Screw (× 1)	CBA1002			
3-12	Nut (× 2)	NF50FMC			

## 16. ELECTRICAL PARTS LIST

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

#### Chip Resistor

RS1/8S □□□J, RS1/10S □□□J

#### Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Unit Number :

Unit Name : Display Unit

### MISCELLANEOUS

### RESISTORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.	Mark	====	Circuit Symbol & No.	====	Part Name	Part No.		
IC	901	902			LC7582ASP	R	901	902	903	904	905	906	RS1/8S103J
IC	903				PD4285	R	907						RS1/10S470J
IC	904				S-80740AH-B4	R	908						RS1/10S223J
IC	905				BX-1393	R	909						RS1/10S471J
Q	901			Chip Transistor	2SC2712	R	910	912	916	918	920	470Ω	CCN1042
Q	902			Chip Transistor	DTC144EK	R	914					47kΩ	CCN1044
D	901	902	903	904	905	906	Chip Diode	MA143-MC	R	922			RS1/10S103J
L	901				Inductor	CTF1114	R	923	924				RS1/10S104J
X	901					CSS1069							
IL	901	902			Lamp 8V 60mA	CEL1185							
IL	903	904	905	906	Lamp 14V 40mA	CEL1150							
					LCD	CAW1096							

## CAPACITORS

Mark ===== Circuit Symbol &amp; No. === Part Name

Unit Number :  
Unit Name : Composite Unit

Part No.

C 901 902  
C 903 904 905 906 916 917  
C 907 908 909 910 911  
C 912 913  
C 914 915CEA470M6R3LS  
CKSQYB103K50  
CKSQYB152K50  
CCSOCH221J50  
CCSOCH301J50  
R 1 2 3 4 5 6  
R 7 8  
R 1 2  
R 3 4  
R 5 6Semi-fixed 47kΩ (B) CCP1104  
Semi-fixed 10kΩ (B) CCP1100  
RS1/10S752J  
RS1/10S393J  
RS1/10S563JUnit Number :  
Unit Name : Power Supply UnitR 7 8  
RS1/10S184J

## Power Supply Unit

Consists of

- Connector P.C. Board
- Power Supply P.C. Board
- OPT OUT P.C. Board

## MISCELLANEOUS

Mark ===== Circuit Symbol &amp; No. === Part Name

Part No.

IC 981  
IC 982  
Q 981 Chip Transistor  
Q 982  
Q 983 985 986 Chip TransistorL780505  
KHA02  
UN2214  
2SB1243  
UN2211IC 202  
IC 203  
IC 351  
IC 451  
IC 452TC74HCU04AF  
NJM3404AM  
CXA1081Q  
KHA176  
TC4053BFQ 984  
Q 987 Chip Transistor  
D 251 253 983 987 990 991  
D 254 255 256 257 258 Chip Diode  
D 981 984 985 986  
D 9822SA1241  
UN2213  
ERA15-02VH  
MA153-MC  
ERA15-10VH  
RB100AVH  
IC 651  
IC 655  
IC 662  
IC 668 669  
IC 701  
IC 702  
IC 703  
IC 704  
IC 705  
IC 711  
IC 712 851 852 853  
IC 751  
IC 752  
IC 753  
IC 971AN8377H  
M5228FP  
M5218FP  
LA6501-FA  
CXD1167Q  
PD0075  
SN5840CS  
PD7008  
V-15M934-D110  
M5238FP  
RC2068MD1  
PD4278  
CXXK581EM-15L  
M51955AFP  
NJM78105UA

## RESISTORS

Mark ===== Circuit Symbol &amp; No. === Part Name

Part No.

R 251 252 253 254 255  
R 256 257  
R 261 262 263 264  
R 265 266 267 268  
R 269 987RS1/10S471J  
RS1/10S0R0J  
RS1/10S223J  
RS1/10S561J  
RS1/10S223JIC 972  
0 201 301 653 951 953 959 961 Chip Transistor 2SC2712  
0 202  
0 302  
0 351  
Q 352 601 701 702 751 755 854 955 960 963 UN22112SC1621  
2SB1184F5  
2SB1260  
Chip Transistor  
Chip TransistorR 981 982 984 986  
R 983 985  
R 988RS1/10S103J  
RS1/10S102J  
RD1/4PS102JLQ 451 452  
Q 453 501 853  
Q 503 857DTC323TK  
IMD3  
2SD1767

## CAPACITORS

Mark ===== Circuit Symbol &amp; No. === Part Name

Part No.

C 251  
C 981 985 987 989 991 992 993  
C 982 990  
C 983  
C 984 986 988CKSQYB224K25  
CKSQYB104K25  
CCH1003  
CCH-114  
CEA101M10LS  
CKSQYB473K25  
CEKA221M10  
CEA3R3M35LSQ 756 952 954  
Q 851 852  
Q 957  
Q 958  
Q 964Chip Transistor 2SB1184F5  
Chip Transistor DTC323TK  
Chip Transistor 2SD1767CF5  
Chip Transistor 2SC3651  
Chip Transistor UN2213

Mark	Circuit Symbol & No.				Part Name	Part No.	Mark	Circuit Symbol & No.				Part Name	Part No.
Q 965					Chip Transistor	2SB1260	R 465	466					RS1/10S302J
D 201 301 702 756					Chip Diode	MA151K-MH	R 467	468					RS1/10S123J
D 302 502 653 951 955					Chip Diode	MA738	R 471	472					RS1/10S392J
D 451 851					Chip Diode	MA151WA-MN	R 501	609 614 702 961					RS1/10S104J
D 501					Chip Diode	MA3068M	R 502	518 519 522 525					RS1/10S681J
D 661 662					Chip Diode	HZK2ALL	R 503	505 514 767 773 780	100kΩ				CCN1047
D 663					Chip Diode	HZK11B	R 507		2.2kΩ				CCN1048
D 701					Chip Diode	MA151WK-MT	R 510						RS1/10S222J
D 757 758 759 760 761 762	Chip Diode	MA153-MC	R 520					10kΩ					CCN1043
D 852 956		Chip Diode	MA3091L	R 524									RS1/2S821J
D 954 958		Chip Diode	MA3075M	R 526	527								RS1/10S151J
D 957		Chip Diode	HZK6BL	R 601	602 659								RS1/10S101J
D 959		Chip Diode	MA3200M	R 606									RS1/10S224J
L 201		Inductor	CTF1006	R 607	776								RS1/10S683J
L 202 451		Inductor	CTF1006	R 611									RS1/10S432J
L 751		Inductor	CTF1114	R 612									RS1/10S623J
L 851 852		Inductor	LAU150K	R 613									RS1/10S624J
L 951		Choke Coil	CTH1074	R 618									RS1/10S105J
TH 351		Thermister	CCX1006	R 620	642 688								RS1/10S272J
X 501			CSS1068	R 621									RS1/10S184J
X 701		Crystal Resonator	CSS1067										
X 751		Crystal Resonator	CSS1070	R 623									RS1/10S224J
S 751		Switch(SOURCE/PRE OUT)	HSH-156	R 624	666								RS1/10S393J
S 752		Switch(Reset)	CSG1020	R 625									RS1/10S203J
TC 751		Trimmer	CCL1018	R 627	708 757 778 800								RS1/10S104J
VR 604		Semi-fixed 2.2kΩ (B)	CCP1015	R 628	658 668								RS1/10S183J
BZ 751		Buzzer	CPV1010	R 630									RS1/10S273J
ZN 750			ERZ-CF2MK220	R 631	637 690 691								RS1/10S272J
				R 634									RS1/10S474J
				R 635									RS1/10S822J
				R 644	795 797 798 799								RS1/10S682J
RESISTORS													
Mark	Circuit Symbol & No.				Part Name	Part No.							
R	201 202 204 210 212 353 692 709 711 714					RS1/10S102J	R 651						RS1/2S101J
R	203 303 636 643 652 673 697 706 707 962					RS1/10S473J	R 653	704					RS1/10S472J
R	205 705 785						R 654	656					RS1/10S163J
R	206 207 622 670 680 681 682 686 687 699					RS1/10S103J	R 655						RS1/10S363J
R	208						R 657						RS1/10S150J
R	209						R 669						RS1/10S563J
R	211						R 672						RS1/10S354J
R	213 215 217 717 718 720						R 674						RS1/10S133J
R	301 379 958						R 676	677					RS1/10S201J
R	302						R 683	684					RS1/10S586J
R	304 307						R 694						RS1/10S822J
R	305 469 470						R 698	792 793 963					RS1/10S103J
R	306 381 689 861 862						R 701	703 786 787 788 789 790 791 865	952				RS1/10S103J
R	351						R 710						RS1/10S202J
R	354 378						R 712						RS1/10S392J
R	355 610 685						R 713						RS1/10S390J
R	356 358	56kΩ					R 715	784 794 898					RS1/10S102J
R	360	82kΩ					R 716						RS1/10S470J
R	362						R 719						RS1/10S561J
R	363 775						R 721	722 723 724					RS1/10S103J
R	364 365 671						R 725	726 727 728					RS1/10S153J
R	366 377 665						R 729	730 760 761 777 796 951 956					RS1/10S473J
R	367 731 732						R 733	734					RS1/10S102J
R	380 616 617						R 735	736					RS1/10S101J
R	382 667						R 737	738					RS1/10S152J
R	383 608						R 739	740					RS1/10S102J
R	384						R 759	762 763 768 771 772 774					RS1/10S104J
R	451 511 516 756	100kΩ					R 764	769 770					RS1/10S221J
R	461 462						R 765	766					RS1/10S221J
R	463 464						R 783						RS1/10S080J
R							R 851	852 855 856 857 858					RS1/10SE472D

Mark	=====	Circuit Symbol & No.	====	Part Name	Part No.	Mark	=====	Circuit Symbol & No.	====	Part Name	Part No.					
R	853	854			RN1/10SE472D	C	711				CCSOCH220J50					
R	859	860			RS1/10S302J	C	717				CKSYB104K25					
R	871	872	873	874	RS1/10S102J	C	720	739	740	747	748	755 851 852 863 864 CKSQYB103K50				
R	875	876	877	878	RS1/10S272J	C	721	722	723	724	725	751 752 952 956 CKSQYB103K50				
R	899				RS1/10S221J	C	731	732				CCSOCH151J50				
R	953	954			RS1/10S102J	C	733	734				CCSOCH150J50				
R	955	957	959	964	RS1/10S103J	C	737	738				CCSOCH220J50				
R	960				RS1/10S821J	C	741	742				CCSOCH122J50				
R	965				RS1/10S222J	C	743	744				CKSQYB822K50				
R	966				RS1/10S103J	C	745	746				CCSOCH122J50				
<b>CAPACITORS</b>																
Mark	=====	Circuit Symbol & No.	====	Part Name	Part No.	C	754				CCSOCH150J50					
						C	761				CCSQCH471J50					
Mark	=====	Circuit Symbol & No.	====	Part Name	Part No.	C	853	854	855	856	CCSQSL152J50					
						C	865	866	955	958	CKSQYB103K50					
C	201	202	214	605	612	620	656	707	713	CKSYB104K25						
C	203						CEV330M10				CKSQYB103K50					
C	204	451	504	652	678	691	692	693	714	715 CKSQYB103K50						
C	205	352	355	467	468	501	611	625	626	709 CKSQYB103K50						
C	206									CKSQYB102K50						
C	207	208	601	623			CKSQYB222K50	Unit	Number	:						
C	209	703	719				CKSYB104K25	Unit	Name	:	Carriage P.C. Board					
C	210						CKSQYB221K50									
C	372						CCSQCH150J50	Mark	=====	Circuit Symbol & No.	==== Part Name					
C	215	505	757				CEV100M16				Part No.					
C	216							M	831		Motor Unit(Spindle)					
C	217	763						M	832		Motor Unit(Carriage)					
C	301	351	706	708	712	716	718	726	727	959 CEV101M6R3						
C	353	613						S	831		Switch(Home)					
C	354	361					CKSQYB6333K25	Unit	Number	:						
C							CS2SR6R8M6R3	Unit	Name	:	Mechanism P.C. Board					
C	356						CKSQYB332K50	Mark	=====	Circuit Symbol & No.	==== Part Name					
C	357	360	651	653	689	710	CKSYB224K25				Part No.					
C	358						CKSQYB473K25									
C	370	373	627	735	736		CCSQCH220J50	D	834	835	836	837 LED(Disc detect)				
C	371	702					CKSQYB102K50	M	833		Motor Unit(Loading)					
C								S	832		Switch(Disc set)					
C	461	462	469	470	857	858	875	876	877	878 CCH1085	Unit	Number	:			
C							33 $\mu$ F/16V				Unit	Name	:	Detector P.C. Board		
C	463	464									CCSQCH100D50					
C	606	616									CEV220M6R3	Mark	=====	Circuit Symbol & No.	==== Part Name	Part No.
C	607	662	859								CKSQYB473K25					
C	608							Q	831	832	833	834	Photo-transistor	PH102		
C	609	756									CEVNP220M6R3					
C	610										CKSQYB472K50	Unit	Number	:		
C	614	630	659	663	971	972	973	974			CCSOCH221J50	Unit	Name	:	P.C. Board	
C	617										CKSYB224K25					
C											CEV4R7M35	Mark	=====	Circuit Symbol & No.	==== Part Name	Part No.
C	618										CKSQYB272K50					
C	621										CEVNP4R7M35	D	1		LED(Disc Set)	PG3668S
C	654										CKSQYB333K25	Unit	Number	:		
C	655										CCSQCH681J50	Unit	Name	:	Miscellaneous Parts List	
C	657										CKSQYB393K25					
C	661										CKSQYB223K50	Mark	=====	Circuit Symbol & No.	==== Part Name	Part No.
C	670										CCH-114					
C	687	688												PU Unit	CGY1015	
C	701										CKSYB224K25	S	1		Switch(D. Sense)	CSN1012
C	704	705									CKSQYB222K50	SO	1		Solenoid	CXP1014
											CCSQCH180J50					